MANCHESTER AND LAWRENCE BRANCH SHARED-USE PATH FEASIBILITY STUDY

PREPARED FOR THE:
CITIES OF LAWRENCE AND METHUEN

BY THE

MERRIMACK VALLEY PLANNING COMMISSION
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Preparation

This document was prepared by the Merrimack Valley Planning Commission (MVPC) in cooperation with the Federal Highway Administration and the Massachusetts Department of Transportation (MassDOT). Funding for this Project was provided under Contract #301200 with the Massachusetts Department of Transportation.

Disclaimer

This document has been prepared in the interest of information exchange. The MVPC assumes no liability for its contents or use thereof.

I. Executive Summary

The Cities of Lawrence and Methuen, Massachusetts share an interest in encouraging bicycling and walking as means of transport. These cities also view transportation as an essential component of their community and economic development programs.

The Manchester and Lawrence (M&L) Branch is a railroad right-of-way between Lawrence, MA and Manchester, NH. The Boston and Maine Railroad (B&MRR) formerly, and PanAm Railways (corporate successor to the B&MRR) currently, owns the M&L Branch. The B&MRR provided passenger and freight service to various communities along the Branch in Massachusetts and New Hampshire for many years. With respect to Massachusetts M&L services, these were furnished directly to the host cities of Lawrence and Methuen. The B&MRR also operated stations and freight yards in Lawrence, and a passenger station / freight house in Methuen along this right-of-way. Passenger service on the M&L was discontinued in the 1950's; freight movements remained active until the 1990s. Today, PanAm Railways delivers a modest amount of freight to one or more businesses only as far north as Manchester Street in Lawrence. Track and other structures, and the Methuen B&MRR station remain in the Massachusetts segment of the M&L Branch.

The Project (as proposed) would utilize the M&L Branch right-of-way which begins at the junction of the former B&MRR Western Division and the M&L Branch on the southern bank of the Merrimack River. The M&L Branch crosses the Merrimack River by a dedicated bridge, and swings northwest across Broadway (Route 28) at-grade. The M&L then runs roughly parallel to Broadway in a northerly direction at-grade, and in alternate elevated or cut segments. The M&L traverses at-grade crossings, bridges and underneath street overpasses at several locations toward the Massachusetts / New Hampshire boundary.

There has been some interest among certain stakeholders in both communities to convert the M&L Branch to a shared-use path, consistent with similar paths constructed in several of the M&L communities in New Hampshire. If constructed, the Project would connect with other similar facilities now in development such as the Merrimack River Trail, the Lawrence Riverwalk, the Shawsheen River Trail, and the Spicket River Greenway. The project has the potential to provide exceptional connectivity to a network of regional trails in development such as the Border to Boston Trail (intersection in Georgetown) via the Merrimack River trail, the Bradford Rail Trail, and the Georgetown Branch shared-use path.

The project vision is the creation of a multi-modal transportation facility that leverages significant community development and transportation investments. The project will be designed to appeal to a wide variety of users, similar to those trails to which it would connect. Further, the project's ability to use a right-of-way with segments that are municipally owned or subject to long-term easements is positive. Finally, the right-of-way connections to public transportation are potentially exceptional.

A few project challenges exist but are not insurmountable. Reuse, replacement or omission of the Merrimack River Bridge from the Project may be a significant factor in determining whether the path terminates on the north bank of the Merrimack River adjacent to the Broadway Bridge. A consideration might be that the path should integrate with the abutting street network at this location. This would also afford the opportunity to abandon the at-grade crossing of Broadway, remove the crossing infrastructure, and tie the path to an existing intersection just north that is perhaps easier and safer to modify. The right-of-way width in Lawrence may permit its retention for future use as a shared transit / path facility – particularly if certain routes could bypass traffic along Broadway during peak congestion periods.

There appear to be some utilities in the right-of-way, i.e. overhead wires. It is unclear what, if any subsurface utilities exist. In general, the utilities are presumed modest and do not appear to preclude other uses of the right-of-way (i.e. transportation, recreation, etc.). The MVPC expects that it will be necessary to secure rights in a few locations where detailed analysis will likely show that there will be right-of-way encroachments and prior land sales. Finally, the design challenge will be to determine whether there are project segments that should be aligned with or use portions of road rights-of-ways to maximize safety and ensure greatest connectivity with residential neighborhoods. It is assumed that the path will be designed to accommodate emergency and maintenance vehicles.

The Cities of Lawrence and Methuen must provide strong guidance on what their plans are for the neighborhoods adjacent to the future path. In particular, Lawrence must advise of former plans for the neighborhoods west of Broadway that inform Project potential to avoid conflicts and ensure that the path supports the City's goals. The work already conducted by Lawrence-based organizations such as Groundwork Lawrence must inform the development of this Project as well.

Particular to this Study, Groundwork Lawrence (GWL) and Lawrence Community Works (LCW) have partnered to develop the shared-use path. The GWL obtained a grant from the Massachusetts Smart Growth Alliance (MSGA) to develop the M&L shared use path project as one of several similar projects throughout Lawrence. The Methuen portion of the M&L shared-use path is being advocated for by local residents. The City of Methuen has executed a 99-year lease with the Massachusetts Bay Transportation Authority, current owner of the M&L Branch, to develop the Project; a similar action will be required for the Lawrence segment of the Project. A potential difference in the amount of rights required for the Lawrence Project segment, particularly to address the potential need to maintain rail service between South Lawrence and Haverhill Street. This must be discussed with the MBTA and PanAm Railways. The MVPC assumes that if rail service is to be maintained, the trail would not be designed to utilize the existing railroad bridge over the Merrimack River to reach South Lawrence at this time.

II. Introduction

The Merrimack Valley Planning Commission (MVPC), as staff to the Merrimack Valley Metropolitan Planning Organization (MVMPO) is undertaking this Project to determine the feasibility of establishing a non-motorized, shared-use transportation facility utilizing portions of the former Boston and Maine Railroad "Manchester and Lawrence Branch" railroad right-of-way. The Project is a priority for Lawrence and Methuen-based organizations and will also facilitate travel between several Concentrated Development Centers (CDCs) identified by the MVPC in its 2009 Priority Growth Strategy. The Project is also recommended by the MVMPO in its 2011 Regional Transportation Plan.

III. History of the Manchester & Lawrence Branch

Prior to the development of railroads in New England, boats were the most efficient means of transport in the Merrimack River Valley communities. By the 1840s, steamboat travel on the Merrimack River between Haverhill and Newburyport served many residents and businesses' needs. West of Haverhill, the river's navigability, naturally limited by its shallow depth and by underwater obstructions, was severely restrained by the construction of the Great Stone Dam in 1845-1848 (National Register of Historic Places in 1977. http://en.wikipedia.org/wiki/Great_Stone_Dam

Land travel remained difficult. Railroad services into the western portion of Essex County through Andover, Lawrence, Methuen and North Andover were promoted by business interests in these communities with particular gravitas in the City of Lawrence, one of the largest planned industrial communities in New England.

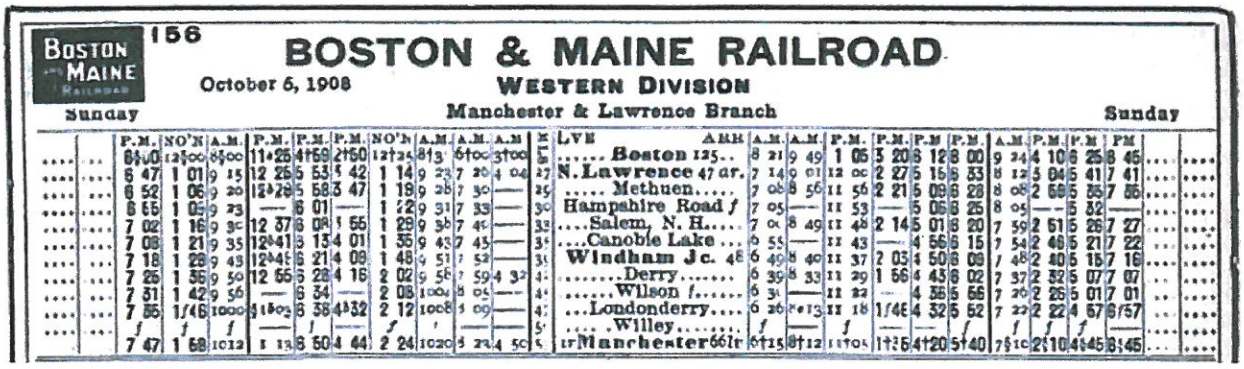
There were several interests in bringing railroad service to the Merrimack Valley region. Perhaps the most significant interests were those of early industrialists then developing what would become major industries at various sites along the Merrimack River, particularly at Manchester, NH; Lowell, Lawrence and Haverhill, in MA. These cities became the region's major centers of employment.

The M&L Branch was developed by two separate entities. The Manchester and Lawrence Railroad (M&LRR) was chartered in 1847 in New Hampshire by Manchester businessmen. Its portion of what would become the M&L Branch ran from Manchester south to the NH/MA boundary in Salem, NH. At about the same time, the Boston & Maine Railroad (B&MRR) developed its Methuen Branch which ran from South Lawrence to meet the Manchester and Lawrence Railroad at the MA/NH boundary in Methuen. Through operations began under the M&LRR with its lease of the B&MRR Methuen Branch. In 1848 the B&MRR relocated its depot between Andover and North Andover to a site along Broadway in South Lawrence, The B&MRR subsequently tried to gain control of the M&LRR; however a series of transactions among other railroads initially prevented this. Meanwhile, the B&MRR opened a second Manchester to Boston route which competed for some of the same customer base as the M&LRR.

In the nineteenth century most of the railroads that eventually combined into the Boston and Maine system were independent and there were many bitter rivalries among them. The Concord (NH) Railroad could get a more favorable rate division from the Boston and Lowell RR by threatening to divert Boston bound freight to the Boston and Maine at Lawrence over the M&L. In1887, the B&MRR gained control of the M&LRR line. Once the major New Hampshire railroads merged into the Boston and Maine, the rate wars between the various New Hampshire railroads ceased and the M&LRR became a lightly used branch line, subsequently labeled the M&L Branch of the B&MRR.

M&L Branch station sites

The Manchester & Lawrence Branch of the Western Division passed through seven towns and cities - two in Massachusetts and five in New Hampshire. They were Lawrence, Methuen, Salem, Windham, Derry, Londonderry, and Manchester. A 1908 timetable (below) shows eleven train stops were located along this line, two of which were in Massachusetts: "North Lawrence", and "Methuen".



BOSTON & MAINE RAILROAD

156

October 6, 1908

WESTERN DIVISION

Manchester & Lawrence Branch

Sunday

LVE	ARR	Sunday
..... Boston 125..	N. Lawrence 47 dr.	7 14
..... Methuen.....		7 08
Hampshire Road f		7 05
....Salem, N. H....		7 01
....Canobie Lake...		6 55
Windham Jc. 48		6 49
.....Derry.....		6 39
.....Wilson f.....		6 31
...Londonderry....		6 26
.....Willey.....		f
17 Manchester 66 lr		6 15

Source: http://www.rememberthebmrr.info/ml/branch.htm
Image: http://i519.photobucket.com/albums/u353/TheBMRR/Historic_Stuff/Hist_ML_Timetable.png

City of Lawrence

NW corner of Essex and Broadway (1 block south of "Theater Row"). Demolished.

In 1879 the B&MRR built a substantial Romanesque-style passenger terminal (building at left, above) on the M&L Branch at the corner of Lawrence and Essex Streets. At various times it was called "Lawrence" or "North Lawrence" or "Lawrence - Essex Street'. This station was closed in 1931; passenger service to Lawrence was provided via other B&MRR rights-of-way and stations located at 331 Essex Street (at the Opera House, later closed) and at an 'art deco' styled station opened in April 1931 at the junction of the Western Route Main Line of the Portland Division with the Manchester and Lawrence Branch (below).

B&MRR Lawrence Station, early 1930's – Merrimack and Parker Streets, S. Lawrence

(Insert current picture of station)

Passenger railroad services to/from Lawrence were later relocated with the B&MRR's closure and sale of the 1931 station. That station is now a commercial building that no longer serves trains (text courtesy William McCaffrey); source: Lawrence Public Library, http://queencityma.wordpress.com/2011/01/11/railroads-lawrence-ma/

City of Methuen

The M&LRR constructed the first "Methuen" passenger station and a freight house about 1850 on a site west of Broadway (Route 28), just south of the city's emergent central business district. This site was ideally suited to serve the growing community as it was proximate to the intersections of many of Methuen's major streets, linking the station with residential, commercial and industrial neighborhoods.

(Insert Sanborn atlas – no elevations of original station have been found, see below)

The railroad can be seen on the 1853 Essex County map, with a small depot and freight house on the west side of the tracks. The same building can be found on the 1872 atlas map. The absence of these two buildings on the 1884 map seems to be an error since they appear again on the 1896 atlas map. Various outbuildings were constructed in the immediate area, one or more by the nearby Methuen Company, to transfer freight to/from the railroad.

The original Methuen station was removed in 1907-1908. A second "Methuen" station was constructed in 1908. It was donated by local resident Edward F. Searles. http://www.methuenhistory.org/Sites/S_thu_W_Streets.html

The 1908 "Methuen" station and the 1850 freight house remain on site at 55 Union Street. The freight house is likely the oldest remaining building associated with the railroad in central Methuen. Passenger service to this station ended in June 1953. The station is privately owned today and is occupied by several businesses including a moving company. The freight house (visible in the second picture) is unused.

East façade, 2008.
Source: http://upload.wikimedia.org/wikipedia/commons/5/53/Methuen_Train_Depot.jpg

West façade. Source: www.oldrr.com

M&L Branch - Post World War II Operations

The B&MRR's corporate parent, the B&M Corporation, weathered many years of instability resulting in service cutbacks. Passenger service on the M&L Branch was eventually reduced to just one round trip per day, and eliminated in 1953. Special summer trains ran to Rockingham Park in Salem for the horse races until 1960. The M&L Branch continued to serve local freight through the 1960s and 1970s. Despite rapid growth in Rockingham County in the 1970s, rail traffic continued to decline. In 1983, after its acquisition by Guilford Transportation Industries (now PanAm Railways), the Springfield Terminal Railway or "ST" (a subsidiary) took over freight service on the M&L Branch. Ownership of the underlying M&L right-of-way in Massachusetts was transferred to the Massachusetts Bay Transportation Authority (MBTA). In 1984, Guilford abandoned the line between Salem and Londonderry, and three years later the line in Londonderry to Manchester Airport was abandoned, leaving the line split in two. Service from Manchester to the airport continued until the mid 1980s when the Manchester segment was taken out of service and freight service between Manchester and the airport ended. Freight ran from Lawrence through Methuen up to the Salem depot until December 1993. Service from Lawrence to the Rockingham Racetrack run-around sidings continued until March 1999, and all service past the Lawrence/Methuen line ended in June 2001. Since then, PanAm Railways has retained operating rights to provide freight service only as far north as Haverhill Street.
http://en.wikipedia.org/wiki/Manchester_and_Lawrence_Railroad

Community Context

MVPC identified and reviewed several data sources to develop a historic perspective of the land uses along the M&L Branch right-of-way. Sources included 1884 and 1892 atlases of Essex County, and Sanborn insurance maps that clearly detail railroad facilities, abutting land uses and businesses that received service from the railroad. Additional information has been provided by members of the Boston and Maine Railroad Historical Society (B&MRRHS).

During the years in which the railroad operated, the majority of the right-of-way traversed dense industrial, commercial and residential neighborhoods. Significant clusters of textile manufacturers proliferated along the M&L in Lawrence, particularly at the Arlington Mills on Broadway. Other businesses served by the M&L included lumberyards, coal dealers, steel distributors, and paper manufacturers. Of particular historical importance to the M&L Branch corridor is its close proximity to the City of Lawrence's "Theatre Row" district, which has been well documented. Over twenty theatres, including five on Broadway and seven on Essex Street, combined with many stores, professional offices and apartments (Lawrence Public Library)

Broadway looking north at Essex Street in1956. Post Office is at the left. Further west is the M&L Branch and site of the former North Lawrence railroad station. "Theatre Row" is in the background. http://www.pbase.com/jroy/image/122518334, collection of the Lawrence Public Library.

Theatre Row (Broadway), 1950s (source: Lawrence Public Library)

Broadway at Essex St, Northwest Corner today. Post office and B&MRR station removed; M&L Branch crosses Essex Street (in background).
http://www.pbase.com/jroy/image/122233706

The M&L Branch in Methuen – Elements of a Historic District

The Searles Tenney Nevins Historic District was established by the City of Methuen in 1992 to preserve the distinctive architecture and rich character of one of Massachusetts' most unique neighborhoods. In the industrial boom of the late 19th century, Methuen city fathers Edward F. Searles, Charles H. Tenney, and David C. Nevins amassed considerable personal fortunes through hat manufacturing, textile production, and railroads. Their investments in Methuen heavily influenced the city's economic development and left a legacy of architecture and civic works that can be seen in mills, housing, schools, mansions, churches, monuments, playgrounds, the library, and the architectural fantasies that resulted from their artistic rivalry. The historic district boundaries were established to include properties and buildings constructed or used by the Searles, Tenney and Nevins families and the people who worked for them.
http://www.cityofmethuen.net/index.php/city-departments-mainmenu-112/historic-district-mainmenu-84.html

Particular to this Study are the former M&LRR Freight House and the 1907 B&M Station at 55 Union Street (both extant, discussed above) and a former Methuen Company storehouse at 62 Rear Osgood Street (c. 1879, demolished 1998). These structures were incorporated into the Historic District.
http://www.methuenhistory.org/Sites/Lost_Methuen.html

IV Current Conditions

The MVPC utilized a variety of data sources from the Cities of Lawrence and Methuen; Boston and Maine Railroad valuation maps obtained from the Boston and Maine Railroad Historical Society, and atlases from various years, photographs, and other documents from Internet sites. The MVPC advises that at such time as the project advances beyond this phase, GPS-based field equipment can be used to locate and record the coordinates of various features along the right-of-way, and this information can be retrieved / or stored and analyzed using GIS technology. The MVPC believes that this approach is the most accurate way to prepare the Project for future design and construction, given that railroad mileposts were tied to specific routes and stations, were subject to change over time, and do not necessarily reflect actual right-of-way conditions in the field today.

Right-of-Way

The Project right-of-way is currently owned by the Massachusetts Bay Transportation Authority (MBTA), excepting rights in the vicinity of and across the Merrimack River that are believed to be the property of ENEL, formerly the Essex Company. The railroad bridge across the Merrimack River is presumed to be owned by the MBTA. The only MA segment that has been active in the past 1-5 years lies between Haverhill Street and the junction with the Western Division in South Lawrence.

Segments of the M&L Branch have been formally abandoned through the U.S. Surface Transportation Board. MP 1.4 – 4.4 (Lawrence-Salem) notice was served on July 5, 2001. Reportedly, the MBTA owns only MP 1.4-3.75
http://www.stb.dot.gov/decisions/readingroom.nsf/UNID/F8A6EEE9AD005CB385256A780058A8C7/$file/31958.pdf
– this needs checking.

There are overhead power lines routed along the western edge of the right-of-way; these lines are presumed in service and assumed to be the property of National Grid (requires verification). These lines now or formerly conveyed electricity to the Arlington Mills complex and run along the entire Massachusetts segment of the M&L. The MVPC observed the presence of fiber optic cable in the right-of-way, running parallel to existing track structures at the western right-of-way edge. No power substations or pumping stations were observed. Pictometry data reveals that there are railroad tracks, ties, switches and other railroad infrastructure present throughout the Project, including at-grade crossings at Broadway, Essex Street, Haverhill Street (Lawrence); Union Street (Methuen) and north of Route 213 in Methuen. The railroad infrastructure appears to be in poor condition north of Essex Street. (We will need to know its STB status).

The MVPC staff could not find any evidence of active railroad right-of-way maintenance north of Haverhill Street. South of Haverhill Street, the right-of-way shows evidence of infrequent brush clearing, with progressively thicker growth points north. The at-grade crossings are the presumed responsibility of the MBTA (owner) or PanAm Railways

(operator); it is also presumed that the MassDOT and the City of Lawrence perform maintenance on the roadways which intersect the right-of-way. ENEL, the corporate successor to the Essex Company, may also own certain rights at the southern end of the M&L where the right-of-way approaches the Great Stone Dam and crosses the Merrimack River. It remains to be determined if there are any high-pressure gas, water/sewer lines, private crossings or other encumbrances within the right-of-way; a detailed title analysis will be required.

Access to the right-of-way is variably open. Some abutters have fenced their properties off; others have unrestricted access or now have access due to fence openings (cuts), and others' buildings or adjacent grades restrict access. The at-grade crossings afford unrestricted access.

Stations and other railroad – related buildings

The MVPC conducted site visits, reviewed maps and information including the Boston and Maine Railroad Historical Society archives to determine the locations and status of such structures. As noted earlier, the removal of the "North Lawrence" passenger station has been field verified. The "Methuen" station is extant, as is a former freight house in the vicinity. The Methuen station is privately owned; it is occupied by several commercial tenants. Ownership of the adjacent freight house remains to be determined.

Mileposts, Markers and Coordinates

The MVPC requested review of the former B&MRR 1914 valuation maps (available only in digitized format) from the Boston and Maine Railroad Historical Society in November 2011 to obtain this information. In addition, the MVPC conducted a Pictometry analysis and assigned coordinates to various structures along the right-of-way. The mileposts were unavailable at the time of writing this report; however, the MVPC is committed to obtaining this information for future project work and recommends field verification as one or more mileposts remain within the right-of-way. As previously noted, the MVPC believes that Pictometry coordinate data will be more useful for this and future shared-use path projects. A few markers were observed in the field.

Drainage structures

A number of culverts channel drainage and/or permit water to flow aside as well as underneath the right-of-way. MVPC staff finds that the right-of-way typically drains by sheet flow to the adjacent grades, which convey drainage to a number of ditches, seasonal and year-round tributaries that parallel and/or cross underneath the right-of-way, ultimately draining to the Spicket and Merrimack Rivers.

The MVPC needs to research if there are any actions being taken in NH or MA relative to periodic flooding of the Spicket River that are connected with the Project.

Bridges:

Lawrence

- Merrimack River. The current structure is believed to have been built about 1850 (requires confirmation) and is the property of PanAm Railways, but is constructed on and over land of ENEL (formerly the Essex Company). Its condition and maintenance records are unavailable to the MVPC.

  Lowell Street over the M&L. This timber bridge carries Lowell Street over the right of way; its deck appears to have been substantially rehabilitated. The MassDOT rates it as a _____. A storm water sewer pipe hangs beneath the bridge; it appears to be conveying drainage from Lowell Street east of the bridge and is discharging it to the M&L right-of-way, which has created significant ponding and is accelerating deterioration of the track structure.

- Manchester Street. This bridge conveys the right-of-way over Manchester Street, a City of Lawrence collector street that connects Broadway (Route 28) with the Tower Hill neighborhood, several large cemetaries and streets leading northward into Methuen. The bridge is constructed of steel girders and is supported by cement? Granite? wing walls. The bridge, track and ties are in place. The street underneath the bridge constitutes a topographical low point, and experiences occasional flooding? The roadway clearance is ____, and has been subject to strikes from trucks and oversize vehicles de temps en temps. The MVPC observed that the structure has sustained some damage and loss of section; however, a review by a qualified engineer would be required to assess its condition.

Methuen

- Oakland Avenue. This bridge, cement over steel, conveys Oakland Avenue (a two-lane local street) above the right-of-way. The bridge directly abuts a cluster of residences and small businesses. MVPC staff observations indicate that the bridge appears to be in fair condition; MassDOT records show that the bridge is rated _____. There are no known active plans for rehabilitation or replacement at this time. The right-of-way is narrow at this location, in a steeply sloped cut and looks to be 20' to 25' wide and has only one track.
- Pelham Street. This bridge conveys Pelham Street above the right-of-way and is adjacent to a complicated five-leg intersection. The clearance is ____. MassDOT data indicates that the bridge is rated _____. There are no active plans known of for rehabilitation or replacement at this time. The right-of-way is slightly wider than at Oakland Avenue; it is occupied by only one track.

Roadway crossings.

There are signals, cross bucks, tracks and associated equipment visible at all of the grade crossings. The intersecting streets are typically poorly defined and lack curbs, lane markings or pedestrian amenities.

Tracks, Ties and Roadbed

Visual inspection indicated that these structures are in poor condition. Is there an embargo on the M&L? Is it "exempt"? While there are rails and ties, these are of marginal quality and in poor repair. Sidings exist at several locations; the MVPC presumes that only one of this is served by PanAm Railways at this time. Switches were found to be in very poor condition. These findings should be verified by a qualified railroad consultant, given that elements may be retained for active rail use or require replacement.

Maps, survey and ownership / easement information

The MVPC reviewed B&MRR 1914 valuation maps, community Assessors' Department maps, Sanborn Maps and Pictometry data to obtain preliminary information. The right-of-way in Lawrence and Methuen is reportedly owned by the Massachusetts Bay Transportation Authority, with operating rights held by PanAm Railways. Portions of the right-of-way, particularly south of Essex Street, may be owned by ENEL, the corporate successor to the Essex Company.

The MVPC was able to view only the valuation maps at the Boston and Maine Historical Society Archives in Lowell, MA. The valuation maps show that the right-of-way is of variable width, ranging from 100' or more at its southern end to 20' in the vicinity of Oakland Avenue in Methuen. Important information about roadway crossings, drainage structures and locations of bridges, railroad facilities, etc. is also shown on these maps. The MVPC has contacted the Society to obtain copies of these documents for its records and for future analysis of the M&L Branch.

The MVPC assigned Pictometry coordinates to various features along the right-of-way that are included with this Report (see Attachment D).

Potential right-of-way discontinuities and encroachments

MVPC observed locations at which the project right-of-way appears to be used in part by abutting properties or by others for disposal of trash and other debris are found throughout, the legacy of inactivity. However, the right-of-way in general is remarkably intact.

Further analysis should be undertaken. Field observations should be compared with property data reviews to establish the presence of easements, private grade crossings, utility crossings and purchases of land prior to determining whether abutting properties

have encroached upon the right-of-way. Completion of this section will require review of MassDOT records to determine when any U.S. Surface Transportation Board (STB) actions were recorded for the abandonment of the M&L Branch.

V. Environmental Resources and Considerations

Environmental Resources

The right-of-way is proximate to or crosses several significant environmental features. The Spicket River is perhaps the most prominent feature within the overall Project. The Project context, being chiefly urbanized land, has been significantly altered over time including filling and construction within riverbank areas, tributaries, associated wetlands, and the construction of extensive roadways, drainage facilities and industrial, commercial and residential structures. The right-of-way context changes quickly north of Pelham Street, where the Spicket River and associated wetlands and tributaries appear to have been altered less. It is known that there have been several large-scale projects active in MA and southern NH to reduce flooding and increase storm water management capacity along the Spicket River. In particular, FEMA provided funding to the State of New Hampshire to purchase and remove homes in Salem, NH to create flood storage areas along the Spicket River; this project is multi-phased and remains active. To date, nine homes have been removed.

Review of Massachusetts data indicates the presence of wetland habitats in the Project area. For example, a portion of the right of way is near / adjacent to an area designated by the Commonwealth's Natural Heritage and Endangered Species Program as providing potential wetland habitat for rare wildlife. The Wood Turtle (Clemmys insculpta), a species of Special Concern in Massachusetts, is documented as being present in the area. Further, habitat for Blanding's Turtle (Emydoidea blandingii-Threatened); Spotted Turtle (Clemmys guttata-Special Concern), and Wood Turtle are reported. Finally, vernal pools are present on land adjacent to the Spicket River between _____ these pools are surrounded by relatively dry, forested uplands. Vernal pools typically lack fresh water supplies; are seasonally dry, and are habitat for amphibians and invertebrates.

The following tables provide an overview of species in the project communities that are classified as E (Endangered); T (Threatened), or SC (Special Concern):

Town	Taxonomic Group	Scientific Name	Common Name	MESA Status	Federal Status	Most Recent Observation
	Amphibian	Ambystoma laterale	Blue-spotted Salamander	SC		2008
	Bird	Asio otus	Long-eared Owl	SC		1981
	Dragonfly/Damselfly	Enallagma laterale	New England Bluet	SC		1998
	Fish	Notropis bifrenatus	Bridle Shiner	SC		2007

	Reptile	Emydoidea blandingii	Blanding's Turtle	T	2007
	Reptile	Glyptemys insculpta	Wood Turtle	SC	1998
	Vascular Plant	Cardamine pratensis var. palustris	Fen Cuckoo Flower	T	Historic
	Vascular Plant	Eriophorum gracile	Slender Cottongrass	T	Historic
	Vascular Plant	Liatris scariosa var. novae-angliae	New England Blazing Star	SC	1874
	Vascular Plant	Platanthera flava var. herbiola	Pale Green Orchis	T	1890
	Vascular Plant	Senna hebecarpa	Wild Senna	E	1872
	Vascular Plant	Sparganium natans	Small Bur-reed	E	1997

Town	Taxonomic Group	Scientific Name	Common Name	MESA Status	Federal Status	Most Recent Observation
	Amphibian	Ambystoma laterale	Blue-spotted Salamander	SC		2004
	Bird	Botaurus lentiginosus	American Bittern	E		1992
	Bird	Ixobrychus exilis	Least Bittern	E		2007
	Bird	Vermivora chrysoptera	Golden-winged Warbler	E		1991
	Fish	Notropis bifrenatus	Bridle Shiner	SC		1998
	Mussel	Ligumia nasuta	Eastern Pondmussel	SC		Historic
	Reptile	Emydoidea blandingii	Blanding's Turtle	T		2009
	Reptile	Glyptemys insculpta	Wood Turtle	SC		2000
	Vascular	Houstonia	Long-leaved	E		Historic

	Plant	longifolia	Bluet		
	Vascular Plant	Scirpus longii	Long's Bulrush	T	2006
	Vascular Plant	Sparganium natans	Small Bur-reed	E	1957

Town	Taxonomic Group	Scientific Name	Common Name	MESA Status	Federal Status	Most Recent Observation
	Amphibian	Ambystoma laterale	Blue-spotted Salamander	SC		2004
	Bird	Haliaeetus leucocephalus	Bald Eagle	E		2006
	Bird	Ixobrychus exilis	Least Bittern	E		1992
	Dragonfly/Damselfly	Gomphus vastus	Cobra Clubtail	SC		2004
	Dragonfly/Damselfly	Neurocordulia obsoleta	Umber Shadowdragon	SC		2004
	Dragonfly/Damselfly	Stylurus spiniceps	Arrow Clubtail	T		2004
	Fish	Acipenser brevirostrum	Shortnose Sturgeon	E	E	1991
	Mussel	Alasmidonta varicosa	Brook Floater (Swollen Wedgemussel)	E		Historic
	Mussel	Lampsilis cariosa	Yellow Lampmussel	E		1866
	Mussel	Leptodea ochracea	Tidewater Mucket	SC		1992
	Mussel	Ligumia nasuta	Eastern Pondmussel	SC		1992
	Reptile	Emydoidea blandingii	Blanding's Turtle	T		2009
	Reptile	Glyptemys insculpta	Wood Turtle	SC		2006
	Vascular Plant	Bidens eatonii	Eaton's	E		2004

		Beggar-ticks		
Vascular Plant	Liatris scariosa var. novae-angliae	New England Blazing Star	SC	1932
Vascular Plant	Potamogeton vaseyi	Vasey's Pondweed	E	1973
Vascular Plant	Trisetum spicatum	Spiked False Oats	E	1914

Source: Massachusetts Division of Fisheries and Wildlife
http://www.mass.gov/dfwele/dfw/nhesp/species_info/town_lists/town_g.htm

The MVPC recommends that a more detailed review of the project right-of-way and abutting properties be undertaken to determine the occurrence of these species in the field, particular to their occurrence on or near the future project right-of-way.

Project Considerations

Flood Zones

The Federal Emergency Management Agency (FEMA) maps indicate the presence of specific Flood Zones throughout the project area. While these zones do not preclude the development of this project, its design, construction and operation must follow certain standards and guidelines.

Subsequent project development activities will require delineation of the following flood zones:

- Zone C: Area of minimal flooding
- Zone B: Areas between limits of 100- and 500-year floods
- Zone A14: Areas of 100-year flood

Property-specific FEMA information is available at www.floodsmart.gov.

In Lawrence, the right-of-way between the southern and northern banks of the Merrimack River are principally within Zones ___ and ___. From this point north to most of the right-of-way lies within Zones B and C.

In Methuen, the right-of-way is on the western bank of the Spicket River. Sensitive areas are near the Arlington Mills; the approach to Methuen Square and wetlands between Methuen Square and Salem, NH.

The MVPC recommends that a detailed flood zone analysis be undertaken in a subsequent stage of project development.

Wetlands and Waterways

The Commonwealth of Massachusetts administers the following regulations that appear applicable to the project:

310 CMR 9.00: The Massachusetts Waterways Regulations (Chapter 91) - June 2009
310 CMR 10.00: The Wetlands Protection Act Regulations - June 2009
310 CMR 10.57 (4)(a)3 and (b)3: general performance standards for proposed projects
310 CMR 10.58: Rivers Protection Act, re: Riverfront Areas
310 CMR 13: Inland wetlands orders
Wellhead Protection Regulations, annotated - April 2001

Detailed information on the above regulations is available at http://www.mass.gov/dep/water/laws/regulation.htm.

Lawrence and Methuen each have a Conservation Commission that administer their own local wetlands bylaws. A content example relevant to this Study is permitted activities in specific buffer zones around wetlands and waterways:

No Cut – No Disturb Zone: 50' around wetlands
Tree Cutting and Brush Removal permitted, 50' – 100'
Specific resource areas defined in the wetlands regulations - 100'
Rivers or perennial streams: 200'

The project would require MEPA and local Conservation Commission approvals.

Surface Waters

Waters of relevance to this project include the Merrimack and Spicket Rivers; ____, ____ and _____ Brooks, and ___ and ____ Ponds.

Hazardous waste releases and remediation

The MVPC reviewed the U.S. Environmental Protection Agency's Region I website and the Massachusetts Department of Environmental Protection's site database (http://db.state.ma.us/dep/cleanup/sites/SearchResults.asp) to identify documented releases in the immediate vicinity of the M&L Branch right-of-way. The MVPC also collected information on the status of these specific releases (see Appendix). Below is a summary of MVPC's research:

Municipality	Address	Date Reported	Type	Status
Lawrence	600 Essex Street	10/12/10	UST-oil	Closed
Lawrence	7-11 Broadway	04/05/07	Chemicals	Closed
Lawrence	50 Bradford Street	04/30/09	Chemicals	Closed
Lawrence	431 Haverhill Street	10/01/93	Chemicals	Closed
Lawrence	6 West Street	01/15/1990	Chemicals	Closed

Lawrence	111 May Street	08/22/03	Oil	Open
Lawrence	45-65 Manchester St	12/03/1999	Hyd. Oil, other oil	Closed
Lawrence	75 Manchester Street	05/20/03	Oil, 50 gals	Closed
Lawrence	85 Manchester Street	01/17/00	Lead, Arsenic, Benzofluorethene	Closed, AUL
Methuen	Chase Street			Closed
Methuen	39 Oakland Avenue	07/15/93	Waste Oil	Open
Methuen	76 Union Street	01/25/07	UST (oil)	Closed
Methuen	15 Pelham Avenue	06/07/08	Transformer fluids	Closed
Methuen	Old Ferry Road	10/16/02	Hydraulic Oil	Closed
Methuen	54 Osgood Street	01/15/94	Various	Open
Methuen	Lowell St. Bridge	05/17/02	UST (oil)	Closed
Methuen	6 Lowell Street	12/01/99	Various	Closed
Methuen	7 Lowell Street	04/21/94	Gas, 1000 gal.	Open
Methuen	490 Broadway	01/15/90	Unknown	Closed
Methuen	484 Broadway	07/15/93	Unknown	Closed

MassDEP records capture only those releases reported in recent decades.

Historic data reviewed for this Study show that most of the M&L right-of-way and properties abutting the M&L right-of-way have been in almost continuous industrial and commercial use since the M&L was established. Railroad operations are presumed to have generated significant quantities of coal and oil byproducts; arsenic and other compounds present in railroad ties as well as herbicides, and lubricating oils. It is presumed that the right-of-way's inactivity, natural processes and gradual cessation of industrial activity have prevented additional contamination from accumulating.

Land uses within ½ mile of the right-of-way

In Lawrence, the project right-of-way crosses industrial land, the Merrimack River and an urbanized post-industrial community comprised of both small and large commercial properties. Records show that land immediately north of the Merrimack River Bridge was occupied by the Pacific Mills; lumber, coal and steel businesses, an extensive railroad freight yard, and other manufacturing interspersed with multifamily residential structures. There is an inactive steel distributor. Much of the urbanized area at the southern end of the M&L Branch (south of Haverhill Street) has experienced substantial structure decay, abandonments, fires, and demolition (i.e. Merrimac Paper). Nonetheless, various buildings, garages and foundations remain in place. Business activity in this segment is geared to vehicle repair, strip commercial stores, fast-food restaurants. Plastics manufacturing operations are active at 265 Lowell Street. There are various automobile repair businesses adjacent to the Project. However, there is significant vitality just east of the right-of-way along Broadway.

Industrial and commercial properties gradually mix with dense multifamily residential properties in the segment between Haverhill and Manchester Streets. The right-of-way subsequently follows the western bank of the Spicket River in the vicinity of the

Arlington Mills – and to the west it abuts (name) large cluster of cemetaries on Currant Hill Road / Railroad Avenue. This right-of-way segment is somewhat isolated, and with the exception of mixed residential and commercial properties in downtown Methuen (and former mill properties converted to residential) traverses wooded areas.

Other structures and uses in the project area

Well heads and fields. There are numerous groundwater monitoring wells adjacent to the project right-of-way in both Lawrence and Methuen. A review of documentation for both Lawrence and Methuen indicates that the project area is served by a municipal water supply, which is sourced from the Merrimack River via Tower Hill reservoir. The project's utilization of existing rights-of-way is not expected to have any functional relationship with or impact upon such structures.

Drainage and Sewerage. The project area is chiefly served by older combined sewers which permit mixing of drainage and sewage during high weather events, and periodic concurrent discharges to the Spicket and Merrimack Rivers waterways via combined sewer overflows. Both of these rivers functioned as open sewers until the advent of EPA regulations. There have been extensive improvements made to portions of the Spicket River to the southwest of the Project, and both the Spicket and Merrimack Rivers' conditions have improved greatly concurrent to the demise of traditional manufacturing activities. it is presumed that the Project will improve drainage quality due to the removal of debris and the repair and/or upgrading of existing drainage structures where required.

Historic sites and properties. MVPC reviewed documentation for these resources using Commonwealth of Massachusetts, City of Lawrence Public Library and City of Methuen online data, and the resources of the Immigrant City Archives.

Arlington Mills
The Great Dam
Former Opera House
Searles Organ Hall

VI. Public Involvement in Project

The public's involvement in the development of this Project varies according to each community context. In Lawrence, Groundwork Lawrence (GWL) is establishing the public involvement plan for its segment of the overall Project. The City is focused on economic revitalization projects at several locations along the right-of-way, and on working with PanAm Railways to determine the future of freight rail service. GWL and the City have already collaborated on the development of the Spicket River Greenway, and the Manchester Street Playground to which the future path should connect. GWL, Lawrence CommunityWorks (LCW) and the City have already committed extensive planning and other resources toward the development of a path network linking several Lawrence neighborhoods. Most recently, GWL engaged an AmeriCorps volunteer to begin talking with area residents, businesspeople and other community stakeholders to build Project support.

In Methuen, bicycling and walking advocates have led local efforts to convert the M&L Branch into a shared-use path. Support for the Project has been generated in the City's Historic District Commission, its Open Space and Recreation Committee, and the Project is referenced in the City's 2007 Master Plan. The MVPC is assisting the City with preparation of an updated Open Space Plan, which includes the Project.

VI. Overview of Trail Components

The Project is defined as a shared-use path in accordance with the following guidance:

AASHTO Bicycle Facilities Guide http://design.transportation.org/Documents/DraftBikeGuideFeb2010.pdf	*A bikeway physically separated from motorized vehicular traffic by an open space or barrier and either within the highway right-of-way or within an independent right-of-way. Shared use paths may also be used by pedestrians, skaters, wheelchair users, joggers, and other non-motorized users.*
U.S. Department of Transportation, Federal Highway Administration http://www.fhwa.dot.gov/environment/bikeped/freeways.htm	*The term "shared use path" means a multi-use trail or other path, physically separated from motorized vehicular traffic by an open space or barrier, either within a highway right-of-way or within an independent right-of-way, and usable for transportation purposes. Shared use paths may be used by pedestrians, bicyclists, skaters, equestrians, and other non-motorized users.*

Source: http://www.access-board.gov/sup/anprm.htm

The project is proposed to be designed for non-motorized transportation connecting neighborhoods in Lawrence and Methuen. It will connect several of the MVPC region's concentrated development centers, and will provide regional recreational opportunities and access to several environmentally significant areas. The Project is intended also to connect with the future Border to Boston and Merrimack River Trails.

The generous width of the Project right-of-way between the Merrimack River and Haverhill Streets in Lawrence might afford an opportunity for transit to share use of the right-of-way. The MVRTA may wish to consider this option to reduce travel times during peak travel periods, when Broadway (Route 28) is particularly congested. It is also the MVPC's intention to preserve PanAm Railways' freight service to customers in this same segment.

The combination of potential user groups requires that the Project accommodate users with a wide range of abilities and interests. In some segments where the right-of-way is isolated from the abutting neighborhoods the MVPC proposes that the Project design prioritize this requirement.

The ability to consider alternative path alignments depends upon the context of properties abutting the Project right-of-way, which predictably vary in size, ownership and use. The Project segment within Lawrence is perhaps the most urbanized, and perhaps abuts some of the largest land parcels and buildings. The Project will benefit from the relative absence of private crossings.

The project's path surfaces and amenities should compliment or match connecting facilities. MVPC recommends that the path be surfaced with bituminous concrete. A shared-use path can be flexibly designed; on average, a 12' wide bituminous concrete paved travel surface marked for bi-directional travel. This surface will be installed with sufficient protection to safeguard against edge raveling, and will be sloped in one direction (not crowned) to facilitate drainage. The path will provide for amenities including benches, lighting and signage, waste receptacles, way-finding and interpretive information, and security / safety equipment. Path at-grade crossings will be required, plus gates / bollards to prevent unauthorized vehicles from entering / exiting the path. Guardrails will be required in some locations to protect trail users where there are obstructions or steep slopes adjacent to the trail. The MVPC recommends that project stakeholders consult sample design cross-sections that are available in various studies including the 2007 FS&T study prepared for the Town of Georgetown. Excerpts of general guidelines can be found in Appendix F of this Study.

In all three communities, the project will require maintenance, restoration and/or replacement of certain bridges and/or culverts crossing small waterways. The MVPC reviewed information for other active shared-use trail projects in the Commonwealth, but was unable to find specific technical or cost data to prepare estimates within the scope of this Study. It appears that any bridge or culvert will be required to meet H-20 design standards, as was projected in the 2007 FS&T Town of Georgetown Study.

Access Points

The trail should be accessible from adjacent streets and public facilities, to maximize Project utility and public safety. The right-of-way is perpendicular to number of streets in all of the Project communities, which lead to residential, employment and transportation nodes:

- Lawrence: Broadway, Haverhill and Manchester Streets
- Methuen: Arlington Mills, Railroad Avenue, Methuen Square

MVPC proposes to work with the trail communities in later project phases to analyze and determine the number and location of local access points.

Trail and Roadway Crossings

The project would require the construction of several roadway crossings in Groveland, most of which require reworking of former at-grade railroad crossings. The Groveland crossings at Center Street and Route 97 west of the Bagnall School are perhaps the most challenging given existing approach geometry. If the project is designed to follow the existing right-of-way between Center Street in Groveland and Trestle Way in Georgetown, a grade-separated crossing permitting the path to cross under Route 97 at Trestle Way in Georgetown would likely be desirable due to roadway geometry, sight distances, travel speeds and projected shared-use path user characteristics. The MassDOT Design Guidebook advises that trail underpasses typically require a path

vertical clearance of 8 to 12 feet. The Guidebook advises further that "there are no clear warrants" that mandate grade separation; therefore, it will be up to the project designer, the communities and other stakeholders to decide whether to grade-separate the path.

Parking

MVPC staff finds that parking could be developed (or existing supplies utilized) in several locations to serve the shared-use path, including:

- Parker Street (South Lawrence)
- Pacific Mills or Pemberton Park, Lawrence
- Haverhill Street
- Former B&MRR Methuen station, Railroad Avenue

Projected Facility Users

Consistent with prior feasibility studies, it is essential to identify the types of bicyclists and other users that the facility will accommodate. One solution to this challenge is to start with the concept of "design cyclist" put forth by the FHWA (*Selecting Roadway Design Treatments to Accommodate Bicycles*, Publication No. FHWA-RD-92-073, January 1994):

> **Group A: Advanced Bicyclists -** Experienced riders who can operate under most traffic conditions. Such bicyclists require direct access to destinations; Operate at maximum speed with minimum delays. Group A riders require sufficient roadway space or shoulder so that bicyclists and motorists can pass without altering their line of travel.
>
> **Group B: Basic Bicyclists -** Casual or new adult and teenage riders who are less confident of their ability to operate in traffic without special provisions for bicycles. These bicyclists require comfortable access to destinations; a direct route to one or more destinations, but on low-speed, low traffic-volume streets or designated
> bicycle facilities; well-defined separation of bicycle and motor vehicles or separate
> bike paths.
>
> **Group C: Children -** Pre-teen riders whose roadway use is initially monitored by parents. These riders require: access to schools, recreation facilities, shopping, or other residential areas; residential streets with low motor vehicle speed limits and volumes; well-defined separation of bicycles and motor vehicles or separate bike paths; establishment and enforcement of speed limits; implementation of traffic calming; provision of wide outside lanes in urban settings and usable shoulders in rural settings.

A future M&L Branch shared-use path will most likely be used by Groups B and C, with some use by Group A bicyclists; pedestrians; in-line skaters, and persons utilizing approved mobility devices. When joined with other trails now in development, the project is expected to be particularly attractive to bicyclists. Further, the project's potential for shared use of existing roadways in some locations renders these rider classifications even more relevant.

Activity Centers To Be Served

The project would directly connect to the City of Lawrence's Canal District, its downtown, indirectly to the Arlington neighborhood in Lawrence and Methuen, and to downtown Methuen.

Right-of-Way Requirements

The approximate Project distance is _____miles. A project right-of-way that is sufficiently wide enough to accommodate a 15' average cross-section is presumed; a scan of the B&MRR 1914 track valuation maps showed that the right-of-way typically ranged from 20' to 25' wide. There will be instances where the right-of-way will prove ample as well as constrained owing to the surrounding grades and overhead structures. Please refer to Appendix F for sample shared-use path design guidelines.

Right-of-Way Ownership and Control

The MVPC's understanding is that most of the right-of-way is owned and/or controlled by PanAm Railways according to whatever rights it acquired from former corporations that established and / or operated it. To-be determined segments of the right-of-way in Lawrence in the vicinity (and possibly including) the Merrimack River are reportedly owned by ENEL, the corporate successor of the Essex Company); The MVPC recommends that a comprehensive title search and property report be performed by a qualified real estate professional. This work will be required to fully understand the status of the project right-of-way, including assignment of rights and tasks required.

Project Development Cost Estimates

The MVPC sampled several recent reports for other rail-to-trail projects to begin developing some project cost information, as follows:

Activity	**Estimated Cost**
Due Diligence	$100,000- $200,000
Design (+-10% of construction cost)	$
General path construction	$ million

Due diligence activities are assumed to include property documentation research, development of information required to secure necessary rights. The MVPC assumed an average $1,000,000 per mile construction cost (excluding bridges, lighting and

drainage structures). For bridges, a controlling design factor will be the structural load rating required (H-20 v. H-10, whereby H-10 is suitable for path maintenance vehicles and H-20 can accommodate heavier construction and emergency vehicles), width of crossing, and field conditions including any existing abutments or structures. The Project may present an opportunity to replace the Manchester Street Bridge with a new structure that provides more clearance for the roadway below, to reduce the chance of vehicle strikes. Use of prefabricated bridges may be a cost-effective option for this project. Each of the project communities will need to determine what types of amenities to be programmed into the project, i.e. street furniture, art, lighting.

Project Maintenance Responsibilities

The MVPC anticipates that once constructed the project will be maintained by the Cities of Lawrence and Methuen. The trails to which the Project will connect may be maintained by their host municipalities, or by other organizations. Whoever becomes responsible would be responsible for maintenance activities including routine inspections, public safety monitoring and response, and provision of lighting in some segments (if included). At such time as the project enters the design phase, a maintenance plan should be developed with short, medium and long term requirements for each of the municipalities. There would be opportunities for the communities to organize a 'friends of the shared-use path' organization or to utilize their recreation or trail committees, or similar groups to commit time and resources toward maintaining the path. This approach has worked very well for other shared-use path projects including the nearby Bruce Freeman Bikepath in the Northern Middlesex MPO region, and is strongly recommended.

Good information is available to aid development of a project maintenance plan. For example, the Rails-to-Trails Conservancy (R2TC) in 2005 released an updated version of its report, Rail-Trail Maintenance & Operation in which R2TC surveyed 100 trails on primary management and design topics including liability, surfaces, drainage, amenities, signs, bridges and budgets. The report is available for download at: http://www.railstotrails.org/resources/documents/resource_docs/maintenance_operations-report.pdf

VII. Project Implementation Plan

The Project can be implemented in multiple phases as a series of discrete tasks. The Methuen segment of the Project right-of-way has already been secured in a long-term lease with the MBTA; it is anticipated that the Lawrence project segment could also be secured by a similar arrangement with the MBTA and/or other owners. If the railroad retains ownership, any structure removals will likely be undertaken by the railroad to obtain materials' salvage values. Alternately, the communities in concert with the MBTA may be able to engage an organization such as Iron Horse Preservation, a non-profit rails-to-trails advocacy group. Iron Horse Preservation in 2011 removed tracks on several rights-of-ways in northeastern Massachusetts for preparation of the Border to Boston and Bradford Rail Trails

Project Stakeholder Roles and Responsibilities

Project communities will hold additional preliminary discussions with participation of residents and municipal officials. To date, the MVPC is unaware of any municipal interest in the Project, but interested parties in the towns of Georgetown and Groveland as well. The communities are responsible for securing right-of-way required to construct and operate the project. The communities will also be responsible for preliminary design, maintenance and outreach to build long-term project support and stewardship. The project communities will also be responsible for investigating whether opportunities exist to reclaim track, ties and other former railroad equipment along the right-of-way. The MVPC's Pictometry data indicates that such infrastructure east of the Haverhill Paperboard property was removed long ago. Tracks and ties exist on the Haverhill Paperboard property and behind several residences on South Water Street, and much of the infrastructure is intact at the Ferry Street underpass.

If the project utilizes federal or Commonwealth of Massachusetts transportation funds, the MassDOT would be responsible for review of the Project's design from 25% to completion; advertising the Project for construction, and selecting and managing the contractor. MassDOT would ensure that the project is developed to meet all applicable federal and Commonwealth of Massachusetts standards, thus qualifying the project as eligible for federal and state funds.

MVPC is preparing this Project Feasibility Study and will incorporate work required to undertake later phases of the Project into future years of its Unified Planning Work Program (UPWP). It will assist its member communities in advancing the Project through the design/engineering and construction process.

National Grid must participate in the project's development process, agree to use of its right-of-way for the project, and work cooperatively with property owners and the host communities to establish use and maintenance protocols.

Design

The MVPC notes that the federal Architecture and Transportation Barriers Access Board in Summer 2011 issued an Advance Notice of Proposed Rulemaking (ANPRM) to develop accessibility guidelines for shared-use paths. The final guidelines are to include technical provisions for making newly constructed and altered shared use paths covered by the Americans with Disabilities Act of 1990 (ADA) and the Architectural Barriers Act of 1968 (ABA) accessible to persons with disabilities. At such time as the Project enters the design phase, its designer should consult these and any subsequent guidelines to ensure the Project's conformity with all applicable design guidelines and standards. As previously noted, if the project utilizes federal or Commonwealth of Massachusetts transportation funds, the path design would be required to comply with MassDOT policies and requirements. It is also likely that the MassDOT would assume responsibility for the design and construction process. In any case, the Consultant

would be required to consult the MassDOT Highway Design Guidebook, particularly at Chapters 6 (Intersection Design) and 11 (Shared Use Paths and Greenways). Excerpts of design guidelines from federal sources can be found in Appendix E of this Study.

The Project design will be coordinated to match connecting trail projects at either terminus – the M&L in Salem, NH and the Merrimack River Trail in Lawrence.

The MVPC proposes the following design considerations for a later project phase:

- No motorized vehicle use excepting emergency vehicles.

- A single treadway. The treadway is likely to be paved with bituminous concrete. The surface should match surfaces that are used on other trails in the region such as the Border-to-Boston and Clipper City trails. This treatment would be preferable given crossings of properties with documented contamination issues. It would also be the practical choice for transportation use.

- Project wayfinding signage should be consistent throughout. It can be coordinated with signage developed for the Merrimack River Trail and the Riverwalk, and the Spicket River Greenway to promote regional connections.

- Path integration with utilities: the separation of the Path from energy transmission facilities. Overhead transmission lines are found throughout the Project right-of-way. The project may present an opportunity to improve right-of-way access for utility maintenance in some locations.

- Portions of the shared-use path may be developed to better connect (and to create activity centers) at local roadways, particularly at Haverhill and Manchester Streets in Lawrence; Arlington Mills, and in Methuen Square. Integrating the shared-use path with such areas would promote security and visibility; maximum connectivity with adjacent land uses, and the Project's utility as a transportation facility.

Permitting

The project proponents (Cities of Lawrence and Methuen, or partnership with GWL, LCW or other organization) and/or their consultants would first prepare a Project Environmental Notification Form (ENF).

Review of MEPA documentation for the nearby Haverhill-Merrimack River Walkway Project indicates that this project will likely require MEPA review based upon the following thresholds:

- A potential M.G.L. Chapter 91 License from the MassDEP
- Orders of Conditions from Lawrence and Methuen Conservation Commissions
- Actions involving Endangered Species pursuant to the Massachusetts Endangered Species Act (310 CMR 10.00), and Issuance of a Conservation and

Management Permit from the MA Division of Fisheries and Wildlife, Natural Heritage and Endangered Species Program (NHESP)

- Work in the 200' Riverfront Area buffer, and potential work in Bordering Land Subject to Flooding.

The Secretary of Environmental Affairs' MEPA Certificate for the Haverhill Riverwalk Project (October 10, 2007) recommended the following actions which are relevant to this Feasibility Study:

1. Use of porous pavement on the M&L Branch to reduce runoff;
2. Develop appropriate measures to minimize any impacts to habitat for Shortnose Sturgeon and Bald Eagles? Or other species that are found within the project boundary;
3. Coordination with the NHESP for any projected entries of equipment (including machinery) into waterways;
4. Review of the Walkway Project's archaeological survey (requirements under 950 CMR 70) and the Massachusetts Historical Commission's findings;
5. Employ MassDEP's Best Management Practices for Controlling Exposure to Soil during the Development of Rail Trails, http://www.mass.gov/dep/cleanup/laws/railtrail.doc and
6. Consultation with the National Marine Fisheries Service to determine if the Project construction schedule will require any restrictions, i.e. project shutdowns, limits on areas of work, etc. The particular species of concern is the Short-Nose Sturgeon.

Cost and Benefit

The MVPC estimates that the Project's construction cost will approximate $1.0 million per mile, exclusive of bridges, lighting and other required elements. It is anticipated that the constructed project has an economic life of twenty years, but practically speaking it will be a permanent facility with a far longer effective life. Its benefits are expected to include:

- capping and reuse of an underutilized right-of-way with a durable, hard-surfaced path that will benefit users and prevent exposure to background contaminants;
- provision of a new access to the Merrimack River waterfront, the Spicket River, local recreational facilities and several Concentrated Development Centers;
- restoration or improvement of water flows from repair and maintenance to culverts and other structures, plus removal of debris;
- increased access to key properties, i.e. Arlington Mills, B&MRR Methuen Station
- increased walking and bicycling to/from residential neighborhoods and business / employment centers.

The project can, if properly designed, also improve access for the utility companies to maintain, repair and regulate the use of their facilities. Each of the communities will benefit by a new walking and bicycling option with future regional connections. The project would also create local economic opportunities, i.e. support for small businesses catering to path users.

The MVPC found two resources to aid future development of a detailed project benefit / cost analysis:

1. Benefit-Cost Analysis of Bicycle Facilities. Sponsored by the National Cooperative Highway Research Program, the Minnesota Department of Transportation, and the Midwest Regional Transportation Center http://www.bicyclinginfo.org/bikecost/, and

2. NCHRP Report 552: Guidelines for Analysis of Investments in Bicycle Facilities. Washington, DC: Transportation Research Board, 2006 http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_552.pdf

In subsequent work, information will be generated that can inform preparation of a detailed project benefit / cost analysis.

Funding

There are several project funding options that the communities and the MVPC can jointly pursue. For example, the Merrimack Valley Metropolitan Planning Organization (MVMPO) has programmed $467,313 in FFY 2013 federal Congestion Mitigation Air Quality (CMAQ) funds for construction of the adjacent Haverhill Riverwalk path segment between Bradford Station and the Basiliere Bridge. The MVPC anticipates that it will work with the project communities toward securing

CMAQ funds for path construction in a future federal fiscal year, once the design advances and sufficient CMAQ funds are made available. Federal Transportation Enhancements (TE), Safe Routes to Schools (SRTS) funds, and federal non-transportation funds (i.e. Brownfields, Community Development Block Grant) also have been used to develop facilities similar to this project. The Rails-to-Trails Conservancy provides excellent on-line information for project development at http://www.railstotrails.org/ourWork/trailBuilding/toolbox/informationSummaries/funding_financing.html.

Iron Horse Preservation or a similar organization may be interested in removing the tracks and ties, and installing a stone dust surface along the M&L. This is an option for advancing the shared-use path project and reducing its development costs.

The cities of Lawrence and Methuen are not Community Preservation Act (CPA) communities. ? (check). funds to design its segment of the project. The CPA, established in 2000, allows communities to create a local Community Preservation Fund to raise money through a surcharge of up to 3% of the real estate tax levy on real property for open space protection, historic preservation and the provision of affordable housing.

The MVPC Transportation Program Unit will continuously scan for other sources of project grants and provide that information to the project host communities.

Finally, during subsequent project phases the municipalities should consult with organizations interested in reclaiming former railroad infrastructure to determine if salvage value could leverage clearing or other interim path development work.

VIII. Appendices

A. Assessors' maps and FEMA maps
B. B&MRR Track Valuation Maps
C. Graphics
D. Pictometry data
E. Right-of-way photographs (source: Scott Currier, B&MRRHS, www.oldrr.com)
F. Sample path design guidelines
G. Sample path / roadway crossing treatments
H. Sample path treatments within utility easements
I. Bibliography

Appendix C: Historic Information and Project Resources

Historic Properties in Project Vicinity

Source: http://www.LandmarkHunter.com/ma/essex;
http://www.google.com/images?imgurl=http://LandmarkHunter.com/photos/51/13/511371-T.jpg

Lawrence

M&L Branch @ Essex Street – view east?

Methuen

Appendix C: Historic Information and Project Resources

Recommended information contacts

Ken Ackerboom,
http://trainguy.dyn.dhs.org/bmrrhs/archives/Sanborn_Index_Web_Page/sanborn_bm_sheets_mass.html) – also consult Lawrence and Methuen to see if they have the Sanborn sheets.
Scott Currier (a member of the Boston and Maine Railroad Historical Society) maintains a railroad archaeology page. See www.oldrr.com/index/gtown.htm. Also www.oldrr.com/bradmap1.jpg. Contact Scott at scott_currier@hotmail.com.

Data Sources

1. Beers, D. and Company, 1893 Atlas of Essex County, Massachusetts. Walker, George H. and Company. 1884 Atlas of Essex County, Massachusetts.
2. Sanborn Map Company. City of Lawrence and Methuen have map book updated through 1936; pages cannot be copied, but can be photographed by us with a digital camera. Maps applicable to Project: 57, 60, 63-64, 68, 71-73.
3. www.floodsmart.gov. Site provides FEMA flood information for properties by address.

Properties of Specific Interest

Eastern Packaging Company – since 1955
283 Lowell Street, Lawrence 01840-1097, 60 employees Erik Curtis, President,
www.easternpackaginginc.com

Appendix C: Historic Information and Project Resources

Appendix C1: Atlas Map

Appendix C2: Atlas Map

Appendix D: MVPC Pictometry Data

Appendix E: MSGA Great Neighborhoods Grant, re: M&L Branch (relevant sections highlighted below)

MASSACHUSETTS SMART GROWTH ALLIANCE
GREAT NEIGHBORHOODS PROGRAM
MEMORANDUM OF UNDERSTANDING (MOU)
PROJECT WORKPLAN, SCHEDULE, BUDGET YEAR ONE (JULY 2011 – JUNE 2012)
EXHIBIT A.1: Scope of Work for Barr Foundation Implementation Funds

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PROJECT: SMART GROWTH LAWRENCE PROJECT

Long Term – 10 Year – Outcomes

a. Create 200 units of housing in the North Canal Mill District
b. Create 200 jobs in the North Canal Mill District.
c. Establish 5 miles of community paths in Lawrence that connect low-income neighborhoods to parks and commercial areas.
d. Establish 3 regional destinations for retail and services.
e. Prioritize and implement identified goals of completed development plans which includes land use, infrastructure, transportation, and economic development strategies.

Two-Year Outcomes (July 2011 – June 2013)

1. Development Plan for Union Crossing. Two Year Outcome: The development plan for Union Crossing to become a mixed-use, commercial and residential green development with open space, using smart growth and low impact development principles will include a viable strategy for 20,000 sf commercial development, create identifying industries and tenants interested in locating in Lawrence, and financing to begin construction on mixed- use housing and commercial space will be secured for Union Crossing.
2. Improve green space and pedestrian infrastructure. Two-year outcome: complete construction of the Spicket River Greenway and plan new connections to it, options include the North Canal Tow Path, East Island (Ferrous site), Oxford Paper site, (M&L Branch) Rail Corridor, and restarting pre-development work for the Riverwalk Trail. By March 2013, local, state and federal funding identified and initial applications will be submitted to implement walk/bike plans.
3. Secure the long-term improvement of the North Canal and surrounding land and infrastructure, in order to facilitate further economic development of the mill district. Two-year outcome: A signed agreement among interested parties to maintain the Canal as well as ongoing collaboration among local businesses. Create innovative solutions for parking to enable economic development; By March 12 draft recommendations for parking changes issued; by 3/13, changes implemented.
4. Assist the City of Lawrence to identify and implement priorities called for in municipal plans. Two-year outcome: Three priorities identified in past plans are achieved.
5. A compelling narrative about the transformation of Lawrence will enjoy the support of a majority of local residents and regional opinion leaders.

Goal 1	**Begin development of Union Crossing by March 2013 based on a development plan to become a mixed-use, commercial and residential green development with open space, using smart growth and low impact development principles.**		
Activities			**Deliverable/ Timeframe**
G1.1	**Identify appropriate commercial uses and tenants for Union Crossing**		By Feb 2012, viable strategy for 20,000 sf commercial development, create identifying industries and tenants interested in locating in Lawrence. Outreach conducted to potential tenants, interest expressed by 1-2 potential tenants.
	G1.1a	Organize community visioning and planning process; engage key city and neighborhood stakeholders	By Nov. 2011, 100 Lawrence community people (including key city & neighborhood stakeholders) will have participated in developing and advancing a vision for Union Crossing that includes 'green' commercial and residential buildings, and open spaces based on smart growth and low-impact development principles. The vision shared among stakeholders and community residents regarding desired commercial uses at Duck Mill will be further refined over the course of the year. Over the 2-year period, 240 community residents will be engaged in the Duck Mill/ Union Crossing project.
	G1.1b	Identify potential consultants with expertise in commercial development	By July 2011, a pool of potential consultants submit responses to RFP; criteria and selection process developed
	G1.1c	Hire a consultant who can identify potential commercial tenants for Union Crossing and/or conduct a market study.	By 8/15/11, select consultant best qualified to achieve these uses, scope of work developed; market study or other means of identifying commercial tenants completed, Understand pricing and decision factors for key commercial sectors.
	G1.1d	Develop commercial strategy, including identifying business	Identify specific clusters, tenants, and begin outreach by

		clusters, possible tenants, etc. Conduct outreach to potential tenants.	December 2010.	
Activities			**Deliverable/ Timeframe**	
G1.2	**Develop plan to successfully finance a project with mixed-use housing and commercial space.**		By March 2013, financing to begin construction on mixed-use housing and commercial space will be secured for Union Crossing. Financing identified/secured to support predevelopment and development of 20,000 sf of job creating commercial space at Duck Mill.	
	G1.2a	Identify options for mixed-use financing for the project.	By March 2012 memo prepared that outlines options for mixed use financing with feasibility of obtaining financing noted	
	G1.2b	Pre-Development: Architecture, development, other activities	By March 2012, Design physical space and due necessary work to enable successful financing for project (through LCW project funding sources).	
	G1.2c	Identify and apply for other funds to support green and commercial elements	Consultant will assist with identifying sources and specifying estimate of how much money will be pending in grants or other sources	
Goal 2	**Improve greenspace and pedestrian infrastructure. Two-year outcome – complete construction of the Spicket River Greenway and plan new connections to it, options include the North Canal Tow Path, East Island (Ferrous site), Oxford Paper site, Rail Corridor, and restarting pre-development work for the Riverwalk Trail.**			
Activities			**Deliverable/ Timeframe**	
G2.1	**Complete construction on the Greenway which will link low-income populations to jobs, shops, parks, and other amenities**		By June 2012, construction of the Greenway linking low-income populations to jobs, shops, health care, parks, public transportation, and other amenities will be complete.	
	G2.1a	Develop a strategy for stewardship of the Greenway and for the creation of a maintenance fund	By June 2012, a maintenance fund for stewardship of the Greenway will have 2 commitments.	
G2.2	**Complete pre-development process for the Riverwalk Trail and other trail projects which will link low-income populations to jobs, shops, housing, parks, public transportation, and other amenities**		By June 2013, the Riverwalk Trail, Rail Corridor or N. Canal Tow Path trail project will be actively in pre-development, with the city and abutting	

			property holders re-engaged and a clear plan will be in place to access existing funding within the Commonwealth's Transportation and Environmental Bond Bills or other available funding.
	G2.2a	Identify resources that are currently available, new sources of funding, and what needs to be done to access them	Agreement on amount and a plan to access the funds allocated to Lawrence's Trails through the Commonwealth's Transportation and Environmental Bond Bills. Work on securing ownership or easements in the connecting parcels including the Ferrous site National Grid, Enel, and Greater Lawrence Sanitary District.
	G2.2b	Visioning and planning activities to engage stakeholders around the Greenway connections. Build the political will in Lawrence needed to build the new connections.	Engage the abutting mill, property and easement owners in the design process, establish which entity will "own" the Trail connections (city, DCR, GWL, other). Based on availability of funds, reestablish dialogue regarding the public/private partnership needed to build the Trails including abutters' financial commitment for building connections and a stewardship fund.
	G2.2c	Engage residents around planning new green space projects.	Hire AmeriCorps member by September 15, 2011 to develop local stewards of the trail projects and support clean-up and restoration of the waterways
	G2.2d	Prepare new trail projects for construction	By October 2011, conduct joint appraisal of the Ferrous site with property owner as precondition for acquiring it; by June 2013, will reach agreement with property owners on at least two parcels to create or secure access to trail network
G2.3	**Conduct an analysis of existing and potential walking and biking facilities and needs.**		

	G2.3a	Complete a strategic analysis of the city's current walkability and identify barriers to increased walkability	Written analysis completed by May 2012.
	G2.3b	Develop campaign (including short and long range goals) to address walkability barriers and the resources it will take to implement the strategy	Campaign established with metrics and timeline by June 2012.
	G2.3c	Create and print maps that show walking routes throughout the City, focusing on key neighborhood assets such as gardens, parks, schools, etc.	Greater understanding among residents about safe routes, healthy living options in the city, and what is walkable; maps completed by May 2012; educational campaign reaches 3,000 residents by September 2012.
	G2.3d	Identify consultant or other resources to assess bikeability and develop a plan to overcome barriers to increased bikeability	Consultant or other resources to conduct assessment; analysis completed by March 2013; plan to address barriers completed by June 2013
G2.4	**Identify and advocate for local, state, and federal funding sources to implement walk/bike plan.**		By March 2013, local, state and federal funding identified and initial applications will be submitted to implement walk/bike plans.
Goal 3	**Secure the long-term improvement of the North Canal and surrounding land and infrastructure, in order to facilitate further economic development of the mill district. Two-year outcomes: A signed agreement among interested parties to maintain the Canal as well as ongoing collaboration among local businesses; enact a parking management plan for the district.**		
Activities			**Deliverable/ Timeframe**
G3.1	Build coalitions within the North Canal District to enable creation of an economic development strategy for the District.		
	G3.1a	Strengthen the North Canal Coalition (NCC), including providing staff support, hosting meetings, and implementing its vision statement	By 9/30/11, North Canal Coalition coalesces around an action agenda for the economic development strategy
	G3.1b	Conduct outreach to the city to engage them with the coalition	By 12/30/11, have regular participation and sustained engagement of appropriate city officials involved in the coalition, have 'buy-in' of city on economic development strategy
	G3.1c	Conduct outreach to businesses to engage them with the coalition Create an action agenda for NCC.	By 12/30/11, NCC determines targets for outreach and engages those businesses in regular participation of the

			coalition
G3.2	**Secure the repair and long-term maintenance of the North Canal**		By June 2013, secure a signed agreement among all invested parties
	G3.2a	Engage key stakeholders in discussions about the future of the North Canal	By April 2012, draft an action agenda that builds on the NCC vision statement and articulates specific outcomes and possible strategies
	G3.2b	Conduct short-term actions that build cooperation among interested parties and improve the appearance of the district	By November 2011, carry out a North Canal clean-up. By May 2012, conduct a clean-up of abutting properties and plantings
	G3.2c	Resolve issues relating to the towpaths, easements, repair of the walls and headgates, and water level and flow	By June 2012, create a campaign to achieve NCC's action agenda
G3.3	**Create innovative solutions for parking to enable economic development**		
	G3.3a	Map current parking areas; usage rights; requirements needed for new development.	Requirements needed for new development determined by 2/12
	G3.3b	Based on research outline strategies and present recommendations for possible changes to parking regulations	By 6/12 draft recommendations for parking changes issued; by 3/13, changes implemented
Goal 4	**Assist the City of Lawrence to identify and implement priorities called for in municipal plans. <u>Two-year outcome</u>: Three priorities identified in past plans are achieved.**		
G4.1	Conduct analysis of existing municipal planning documents and prepare memo and presentation based on results		Prepare memo and presentation by March 2012
G4.2	Convene dinner and training with key stakeholders, including GN coalition members and municipal boards, about the process of developing and implementing		By June 2012, host workshop
G4.3	Identify resources to carry out workshop and begin implementation		$5000 secured to complete workshop and resource development strategy drafted
Goal 5	**Establish a compelling narrative about the transformation of Lawrence that enjoys the support of a majority of local residents and regional opinion leaders**		
Activities			**Deliverable/ Timeframe**
G4.1	**Develop a tangible and concise story about Lawrence's opportunity for transformation**		
	G4.1a	Develop a fact sheet and talking points for project participants	Communication materials have clear target and purpose

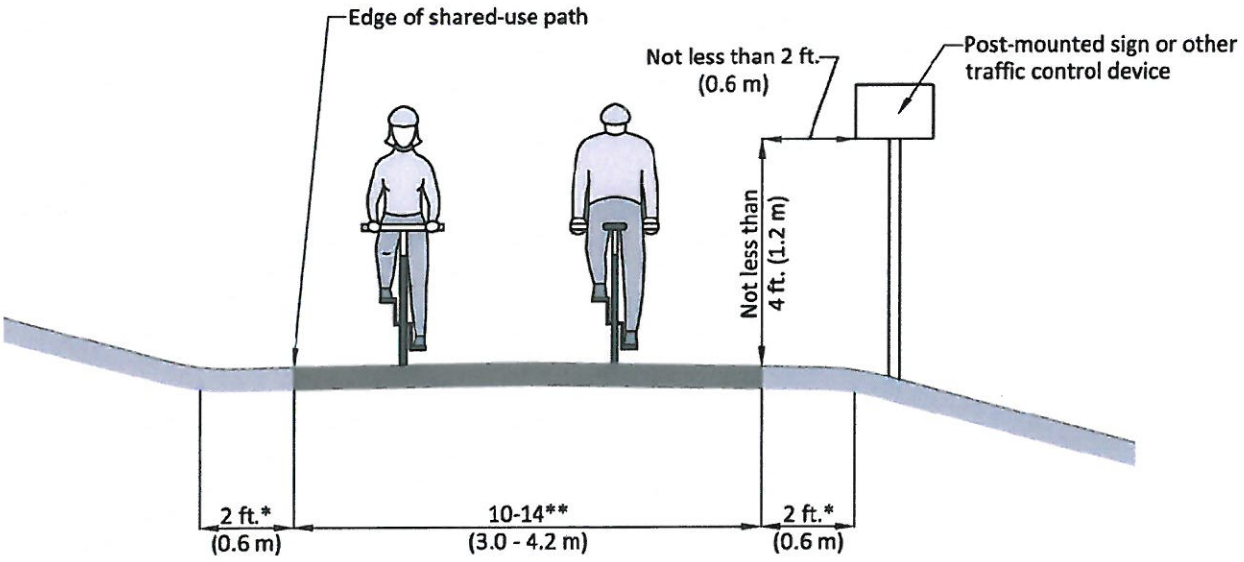
	G4.1b	Secure the endorsement of key opinion leaders, including local and state government officials, media outlets, and neighborhood leaders.	20 one on one discussions conducted with key stakeholders; 15 endorsements for Great Neighborhoods work plan	
	G4.1c	Recruit new voices that embody the story of positive transformation.	5 new volunteers recruited and trained to speak on behalf of project	
	G4.1d	Develop positive media coverage that communicates story of transformation to regional and state officials, foundations, and businesses	By June 2012, run at least two articles in the Boston Globe North section, including one major community profile, two articles in regional Spanish language media, and obtain five positive references to coalition work in the Eagle Tribune	

Appendix F: Sample Shared-Use Path Design Guidelines

1. Width and Clearance

Source: American Association of State Highway and Transportation Officials (AASHTO), February 2010 Draft Guide for the Planning, Design, and Operation of Bicycle Facilities, http://design.transportation.org/Documents/DraftBikeGuideFeb2010.pdf

The usable width and the horizontal clearance required for a shared use path are primary design considerations. Figure 1 below is the typical cross section of a shared use path. The appropriate paved width for a shared use path is dependent on the context, volume, and mix of users. The minimum paved width for a two-directional shared use path is 10 feet (3.0 m). Typically, widths range from 10 – 14 feet (3.0 – 4.3 m), with the wider values applicable to areas with high use and/or a wider variety of user groups.



*6:1 Maximum Slope (typ.)

** More if necessary to meet anticipated volumes and mix of users, per the Shared Use Path Level of Service Calculator (4)

Figure 1: Typical Shared-Use Path Cross Section

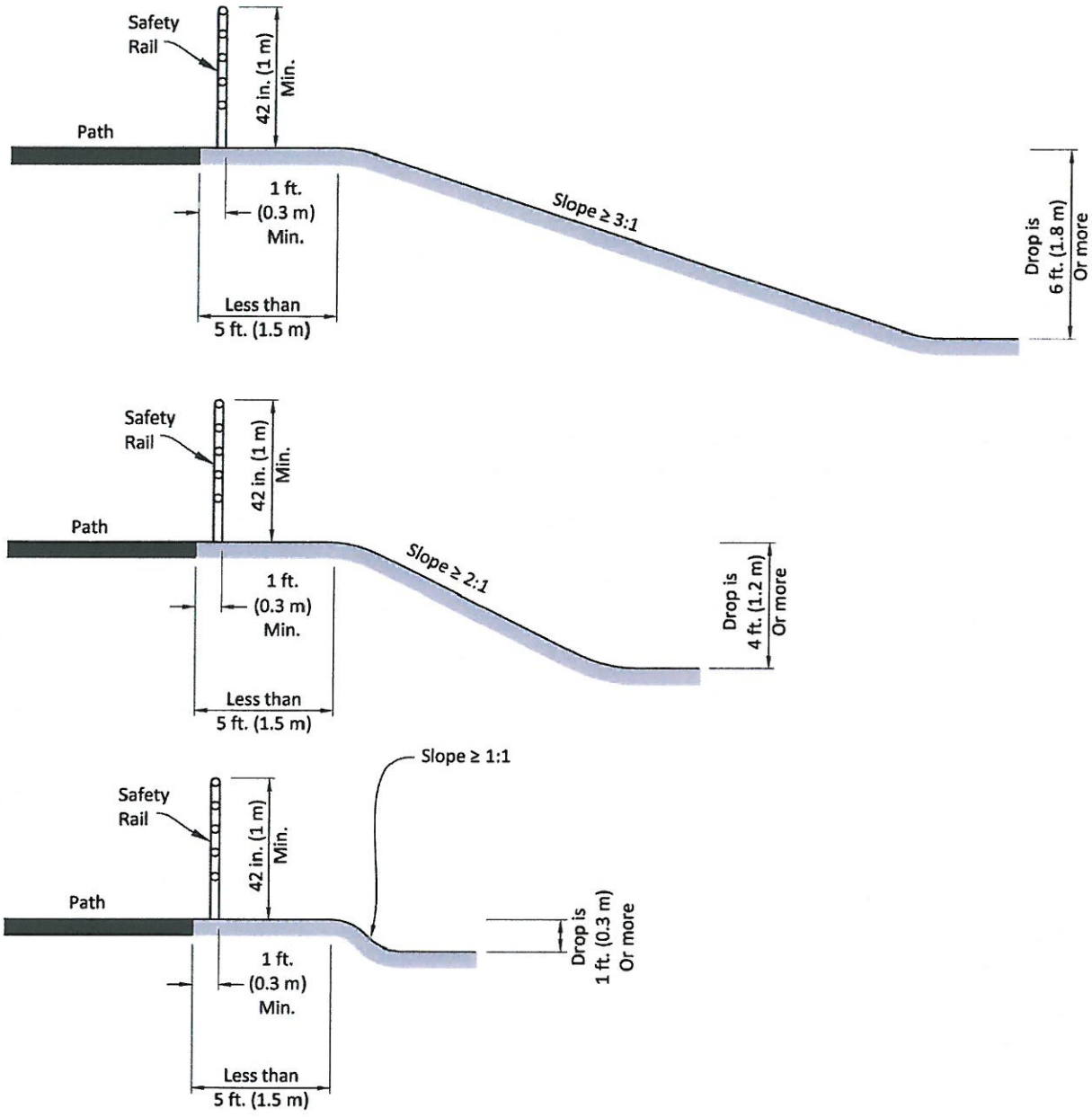
2. Sloped Areas adjacent to the shared-use path

Source: American Association of State Highway and Transportation Officials (AASHTO), February 2010 Draft Guide for the Planning, Design, and Operation of Bicycle Facilities, http://design.transportation.org/Documents/DraftBikeGuideFeb2010.pdf

A graded area (shoulder) at least 3 – 5 feet (0.9-1.5 m) wide with a maximum cross-slope of 6:1should be maintained on each side of the pathway. At a minimum, a 2-foot (0.6 m) graded area with a maximum 6:1 slope should be provided for clearance from lateral obstructions such as bushes, large rocks, bridge piers, abutments, and poles. Where "smooth" features such as bicycle railings or fences are introduced with appropriate flaring end treatments (as described below), a lesser clearance (not less than 1 ft) is acceptable. If adequate clearance cannot be provided between the path and lateral obstructions, then warning signs, object markers, or enhanced conspicuity and reflectorization of the obstruction should be used. Where a path is adjacent to parallel water hazards or downward slopes equal to or steeper than 3:1, a wider separation should be considered. A 5-foot (1.5 m) separation from the edge of the path pavement to the top of the slope is desirable. Depending on the height of the embankment and condition at the bottom, a physical barrier, such as dense shrubbery, railing, or fencing may be needed. This is an area where engineering judgment must be applied, as it is necessary to compare the risk for an errant bicyclist that swerves off the path to the risk of the rail itself. Where a recovery area (i.e., distance between the edge of the path pavement and the top of the slope) is less than 5 feet (1.5 m), physical barriers or rails are recommended in the following situations:

- Slopes 1:1 or steeper, with 1 a drop of 1 foot (0.3 m) or greater;
- Slopes 2:1 or steeper, with a drop of 4 feet (1.2 m) or greater;
- Slopes 3:1 or steeper, with a drop of 6 feet (1.8 m) or greater, and
- Slopes 3:1 or steeper, adjacent to a parallel water hazard or other obvious hazard

The barrier or rail should begin prior to and extend beyond the area of need. The lateral offset of the barrier should be at least 1 foot (0.3 m) from the edge of the path. A diagram illustrating this design element is viewable on the following page:



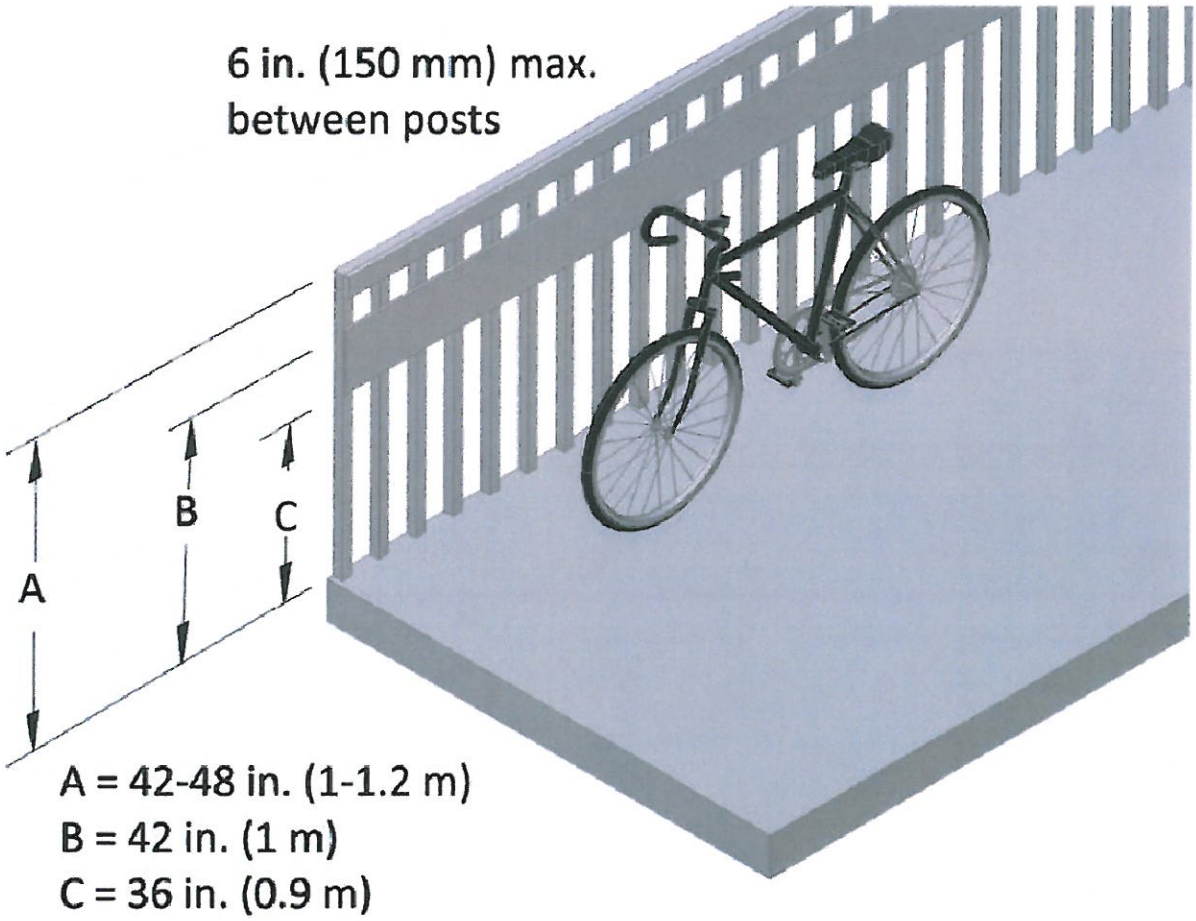
Sloped Areas adjacent to the shared-use path (continued from Page 34)

Appendix F: Sample Shared-Use Path Design Guidelines (Continued)

3. Shared-Use Paths Utilizing Bridges

Source: American Association of State Highway and Transportation Officials (AASHTO), February 2010 Draft Guide for the Planning, Design, and Operation of Bicycle Facilities, http://design.transportation.org/Documents/DraftBikeGuideFeb2010.pdf

Bridges should be designed for pedestrian live loadings. Where maintenance and emergency vehicles may be expected to cross the bridge, the design should accommodate them. On all bridge decks, special care should be taken to ensure that bicycle-safe expansion joints are used, and that decking materials are not slippery when wet.



Source: Architectural and Transportation Barriers Compliance Board, 36 CFR Chapter XI, Shared Use Path Accessibility Guidelines, **http://www.access-board.gov/sup/anprm.htm.**

Source: http://www.bicyclinginfo.org/engineering/paths-details.cfm

Preventing motor vehicle use of paths

In some locations, shared use paths may be mistaken for motor vehicle roads or may suffer from illegal or unauthorized motorized use. At intersections with roadways, therefore, the path should be clearly signed, marked and/or designed to discourage or prevent unauthorized motorized access. A variety of alternatives exist to achieve this:

a. bollards. Probably the most common device is the bollard, often lockable, collapsible or removable to allow for authorized access to the trail. Great care should be used in locating the bollard to ensure that they are visible, allow trail users through, and are not placed so as to channel both directions of trail users towards the same point in the trail. If bollards are to be used, they should be retro-reflective, brightly colored, and have pavement markings around them. On a ten foot trail, one bollard should be used in the center of the trail. If more than one bollard is necessary, there should be five feet between them.
b. splitting the trail in two. Many manuals suggest the option of splitting a ten foot trail into two five foot approaches to an intersection, with a planted triangle between them. This may increase maintenance costs.
c. medians. The Florida DOT manual notes that "curbing with tight radii leading up to the roadway can often prevent motorists from attempting to enter the path. Medians should be set back from the intersection 25 feet (8m) to allow bicyclists to exit the roadway fully before navigating the reduced pathway width.

Gates and Barriers

Clear Width. Where gates or other barriers are provided, openings in gates and barriers shall provide a clear width of 32 inches (815 mm) minimum.

Gate Hardware. Gate hardware shall be operable with one hand and shall not require tight grasping, pinching, or twisting of the wrist. The force required to activate operable parts shall be 5 pounds (22.2 N) maximum. Operable parts of such hardware shall be 34 inches (865 mm) minimum and 48 inches (1220 mm) maximum above the finish surface or ground. The draft technical provisions for gates and barriers are based on the Board's ADA and ABA Accessibility Guidelines and Trails Guidelines. Gates or barriers often are wider than 32 inches to allow for the safe passage of bicycles and other authorized users of shared use paths. The Board is proposing to require a 32 inch minimum clearance to address the rare circumstance where gate or barrier openings are deliberately narrow and could restrict access by wheelchair users unless a minimum

width applies. A 32 inch wide clear opening provides the minimum clearance necessary to allow passage of an occupied wheelchair or other mobility device. The operation and location provisions for gate hardware are necessary to ensure that individuals with disabilities can operate the hardware.

Appendix G: Sample Path / Road Crossing Treatments

Source: Paths & Trails Element
City of Vancouver (WA) Walking & Bicycle Master Plan, January 2004
http://www.cityofvancouver.us/parks-recreation/parks_trails/trails/pdfs/1Intro&DesignGuidelines.pdf

Basic Crossing Prototypes

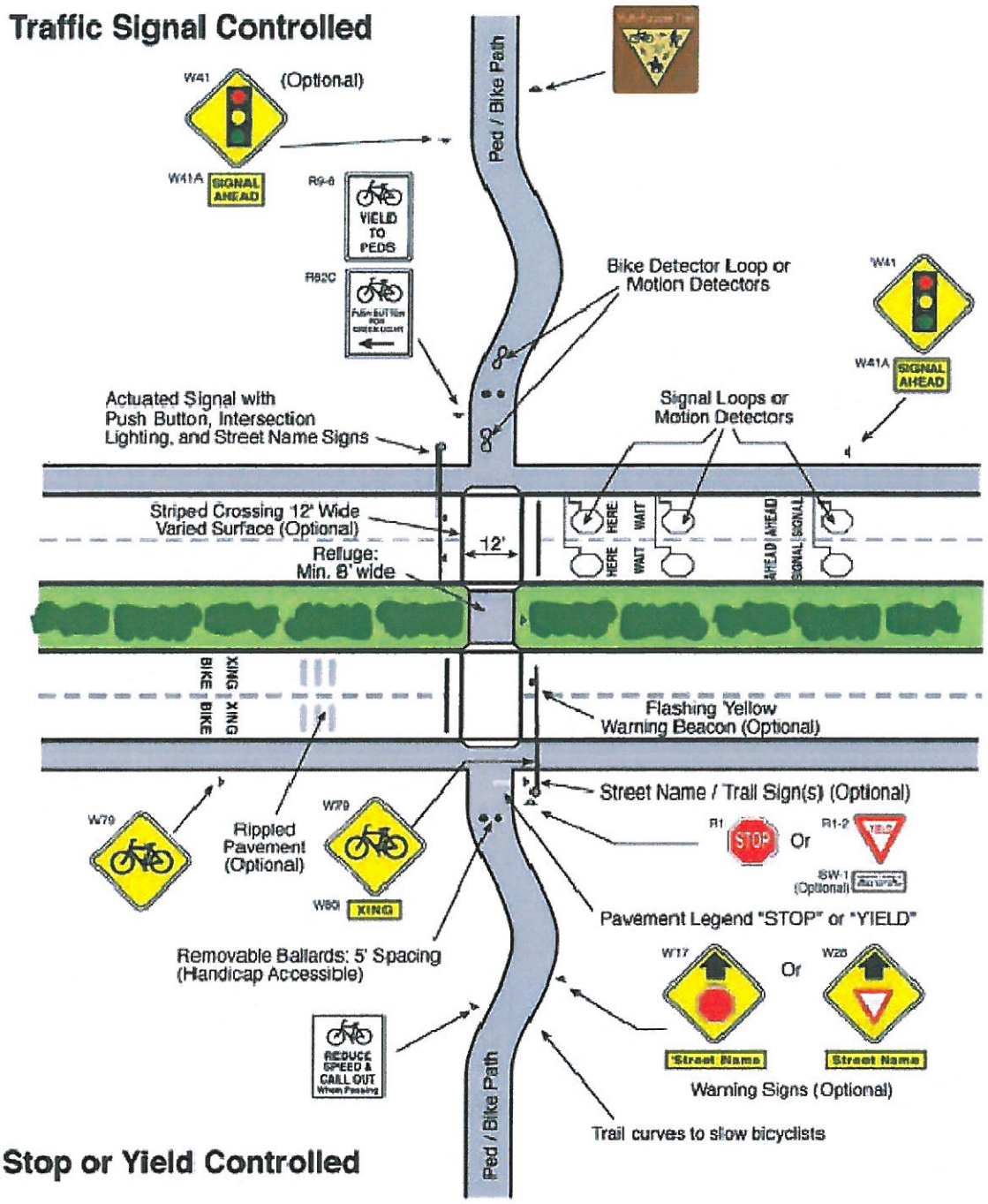
• Type 1: **Unprotected/Marked Crossings**. Unprotected crossings include mid-block crossings of residential, collector, and sometimes major arterial streets. Includes installation of crosswalks at all locations. Standards for use include:

Roadways with:

- maximum traffic volumes of 10,000-15,000 average daily traffic (ADT), and / or 1,000-1,500 vehicles in peak hour
- Maximum 85th percentile speeds: 35-45 mph
- Maximum trail user volumes:50-75 per hour, 300-400 per day
- Maximum street width: 60 feet (no median)
- Minimum line of sight: 25 mph zone: 100 feet; 35 mph zone: 200 feet; 45 mph zone: 300 feet

• Type 2: **Divert Users to Existing Intersection.** Bikeways which emerge near existing intersections may be routed to these locations.

• Type 3: **Signalized/Controlled Crossings.** New signalized crossings are recommended for crossings more than 250 feet from an existing signalized intersection and where 85th percentile travel speeds are 45 mph and above and/or ADT's exceed 15,000 vehicles. Each crossing, regardless of traffic speed or volume, requires additional review by a registered engineer to identify sight lines, potential impacts on traffic progression, timing with adjacent signals, capacity, and safety. Trail signals are normally activated by push buttons, but also may be triggered by motion detectors. The maximum delay for activation of the signal should be two minutes, with minimum crossing times determined by the width of the street and trail volumes. The signals may rest on flashing yellow or green for motorists when not activated, and should be supplemented by standard advanced warning signs. Typical costs for a signalized crossing range from $75,000 to $150,000.



Type 1 or 3 Crossing Prototype (depending on presence of signal)

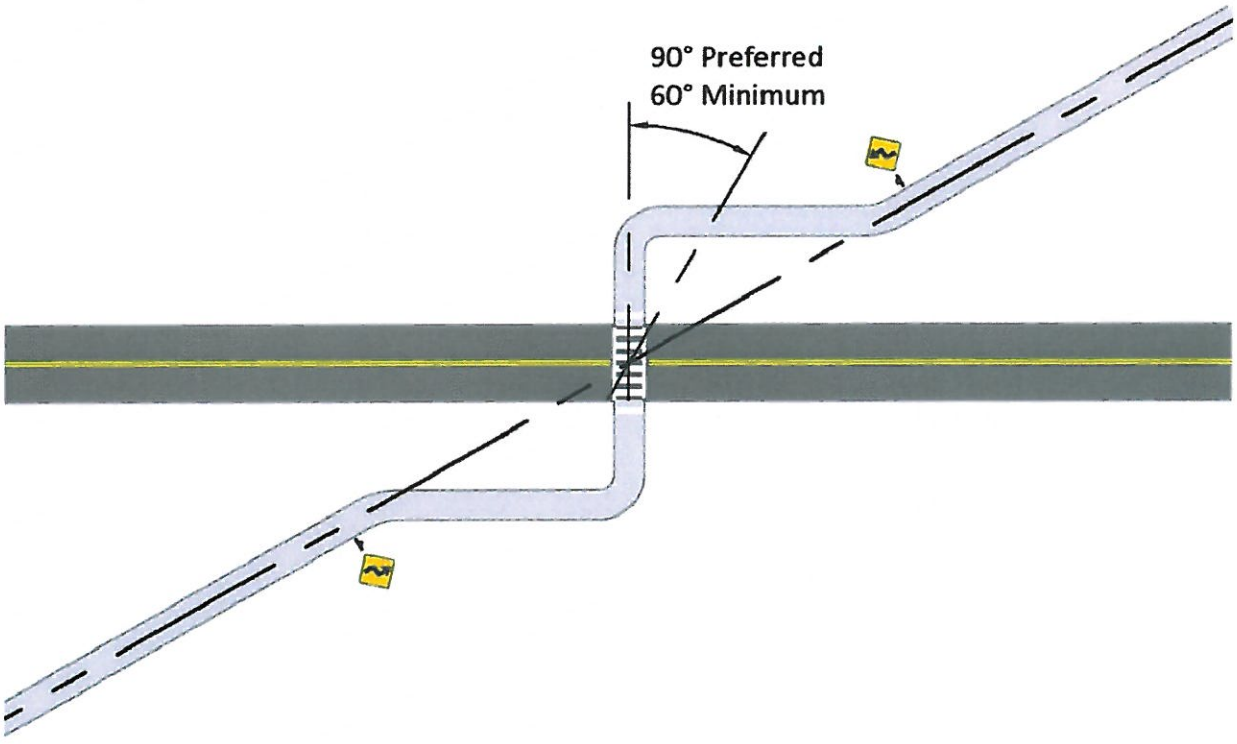
• Type 4: **Grade-separated**: Bridges or under crossings provide the maximum level of safety but also generally are the most expensive and have right of way, maintenance, and other public safety considerations.

Appendix G: Sample Path / Road Crossing Treatments
Geometric Design Issues at Crossings

Source: American Association of State Highway and Transportation Officials (AASHTO), February 2010 Draft Guide for the Planning, Design, and Operation of Bicycle Facilities,
http://design.transportation.org/Documents/DraftBikeGuideFeb2010.pdf

The design approach for the intersection of a shared use path with a roadway is similar to the design approach used for the intersection of two roadways in the following ways: The intersection should be conspicuous to both road users and path users. Sight lines should be maintained to meet the requirements of the traffic control provided.

Intersections and approaches should be on relatively flat grades. Intersections should be as close to a right angle as possible, given the existing conditions. The least traffic control that is effective should be selected. It is preferable for midblock path crossings to intersect the roadway at an angle as close to perpendicular as practical, so as to minimize the exposure of crossing path users and maximize sight lines. A crossing skewed at 30 degrees is twice as long as a perpendicular crossing, doubling the exposure of path users to approaching motor vehicles, and increasing delays for motorists who must wait for path users to cross. Retrofitting skewed path crossings can reduce the roadway exposure for path users. Exhibit 5.14 depicts a path realignment to achieve a 90-degree crossing. A minimum 60-degree crossing angle may be acceptable to minimize right-of-way requirements.



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National Grid. Five-Year Vegetation Management Plan 2009-2013. March 20, 2009 www.**nationalgridus.com/.../National_Grid_**VMP_**2009-2013**.pdf

Methuen, MA Boston and Maine Railroad Depot. Source:

Date/Time	**Thumbnail**	**Comment**	
current	19:13, 22 September 2008	EraserGirl	({{Information |Description= Methuen Train Depot, Railroad Ave, Methuen Massachusetts |Source=self-made |Date=08/07/2008 |Author= EraserGirl |Permission=Public domain |other_versions= }} == Licensing == {{cc-by-2.0}} [[Category:Methu)

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U.S. Surface Transportation Board, www.stb.dot.gov. Abandonments:

Salem, NH: MP 4.65-7.60, May 26, 2000

Lawrence, MA: MP 1.4 – 4.4 (to NH State Line), July 5, 2001

Ownership Transfer between B&M and MBTA: MP 1.4 – 3.72, B&M granted exclusive freight easement.

Theatre Row (from Queen City Press, Lawrence Public Library Archives)

Strand Theatre, 92 Broadway 1949-1956

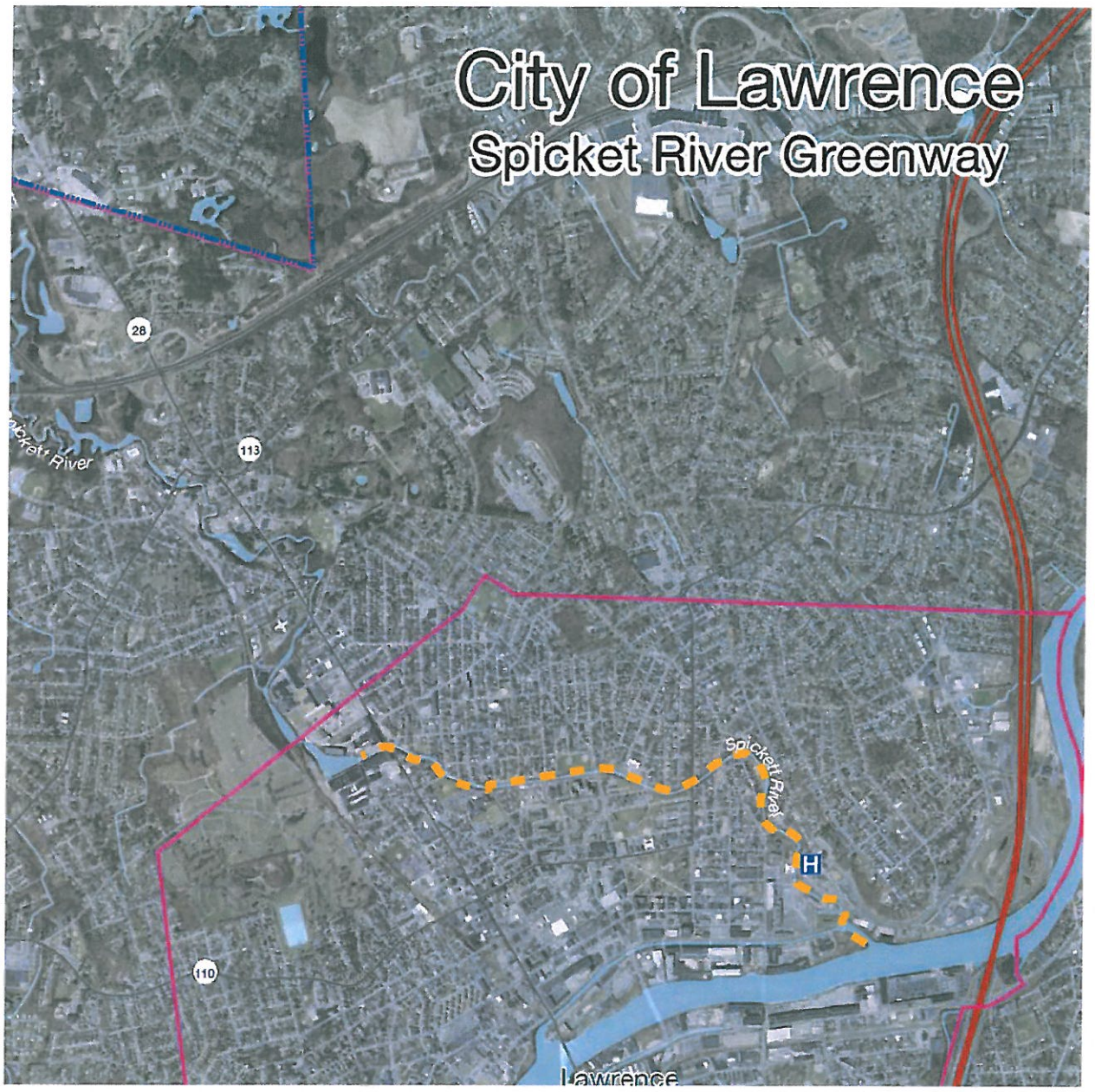
125-127 Broadway, dates unknown

Modern Theatre, 98 Broadway, closed or demo'ed 1959

Broadway Theatre, 104-112 Broadway built 1910, closed or demo'ed 1964

Victoria Theatre, 127 Broadway 1946-1952

Star Theatre, 479 Broadway 1966



Need to show proposed M&L Trail on this Map

Hydropower Information – City of Lawrence – ENEL North America (source: ENEL)
http://www.enelgreenpower.com/en-GB/ena/power_plants/ne/lawrence/

Project Name: Lawrence Hydroelectric
Project Companies: Lawrence Hydroelectric Associates, Inc. and Essex Company
Project Location: Lawrence, Massachusetts
Project Region: Northeast
River Name: Merrimack River
Project Capacity: 16.8 MW
Start of Operations: July 1981
Number of Units: 2 total

In the mid-1970's, the Lawrence Hydroelectric Associates, a partnership intent on a major redevelopment of the Merrimack's power potential purchased controlling interest in the Essex Company. By 1979, the firm had secured private financing, reacquired water rights from mill owners and received the necessary state and federal permits to begin construction on a new $28-million power plant at the south end of the Great Stone Dam.

Without disturbing the historical Great Stone Dam, the Essex Company placed the 16.8 MW project into operation in 1981 with enough generating capacity to meet one third of the electricity needs of a city the size of Lawrence at the time. The Lawrence facility produces enough electricity to power roughly 7,000 average New England homes each year. The Lawrence Project, on Massachusetts' Merrimack River, was developed in 1981 and acquired in 1986 by Enel subsidiaries. Subsidiaries of Enel Green Power North America operate and maintain the project in connection with the 24-MW Boott Hydropower Project in Lowell, Massachusetts, also on the Merrimack River. After acquiring the project, Enel improved the project through such measures as replacement and upgrading of trashracks, automation, automatic pond level control, and redesign of the intake. A hallmark of the Lawrence Project is the management of a complex fish passage system which is part of a regional salmon restoration program. **This facility is relevant to the M&L Branch Shared Use Path as the southern end of the trail will cross ENEL property; further, the Great Stone Dam and the role of hydropower in Lawrence is an important cultural and historic element to which the Path should contribute understanding as well as visitation.**

Manchester & Lawrence Branch Shared Use Path

Lawrence and Methuen, MA / Feasibility Study 2011 - 2012